

APPENDIX: LISTING OF GENES

Angiogenesis

ADM (Adrenomedullin); ANG (Angiogenin, ribonuclease, RNase A family, 5); ANGPT1 (Angiopoietin 1); ANGPT2 (Angiopoietin 2); ANGPT3 (Angiopoietin 3); ANGPT4 (Angiopoietin 4); ANPEP (Alanyl (membrane) aminopeptidase (aminopeptidase N, aminopeptidase M, microsomal aminopeptidase, CD13, p150)); ARNT (Aryl hydrocarbon receptor nuclear translocator); BDK (Bradykinin); BDKRB2 (Bradykinin receptor B2); BTN (Butyrophilin); CD14 (CD14 antigen); CD19 (CD19 antigen); CD1D (CD1D antigen, d polypeptide); CD2 (CD2 antigen (p50), sheep red blood cell receptor); CD20 (CD20 antigen); CD22 (CD22 antigen); CD33 (CD33 antigen (gp67)); CD34 (CD34 antigen); CD37 (CD37 antigen); CD38 (CD38 antigen (p45)); CD39 (CD39 antigen); CD4 (CD4 antigen (p55)); CD47 (CD47 antigen (Rh-related antigen, integrin-associated signal transducer); CD48 (CD48 antigen (B-cell membrane protein); CD53 (CD53 antigen); CD59 (CD59 antigen p18-20 (antigen identified by monoclonal antibodies 16.3A5, EJ16, EJ30, EL32 and G344); CD63 (CD63 antigen (melanoma 1 antigen); CD68 (CD68 antigen); CD7 (CD7 antigen (p41)); CD72 (CD72 antigen); CD8A (CD8 antigen, alpha polypeptide (p32)); CD9 (CD9 antigen (p24)); CD97 (CD97 antigen); CDW52 (CDW52 antigen (CAMPATH-1 antigen)); COL4A2 (Collagen, type IV, alpha 2); COL4A4 (Collagen, type IV, alpha 4); DAF (Decay accelerating factor for complement (CD55, Cromer blood group system)); DPP4 (Dipeptidylpeptidase IV (CD26, adenosine deaminase complexing protein 2)); EGF (Epidermal growth factor); EGFR (Epidermal growth factor receptor (avian erythroblastic leukemia viral (v-erb-b) oncogene homolog)); EMAPII (Endothelial monocyte-activating polypeptide); EMAPL (Echinoderm microtubule-associated protein-like); ENG (Endoglin (Osler-Rendu-Weber syndrome 1)); F3 (Coagulation factor III (thromboplastin, tissue factor)); F8C (Coagulation factor VIIIc, procoagulant component (hemophilia A)); FAP (Fibroblast activation protein, alpha); FGF1 (Fibroblast growth factor 1 (acidic)); FGF2 (Fibroblast growth factor 2 (basic)); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR2 (Fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome, Pfeiffer syndrome, Jackson-Weiss syndrome)); FIGF (C-fos induced growth factor (vascular endothelial growth factor D)); FLT1 (Fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)); FLT4 (Fms-related tyrosine kinase 4); FN1 (Fibronectin 1); GRB2 (Growth factor receptor-bound protein 2); HGF (Hepatocyte growth factor (hepapoietin A; scatter factor)); HIF1A (Hypoxia-inducible factor 1, alpha subunit (basic helix-loop-helix transcription factor)); IGF1 (Insulin-like growth factor 1 (somatomedin C)); IGF2 (Insulin-like growth factor 2 (somatomedin A)); ITGBL1 (Integrin, beta-like 1 (with EGF-like repeat domains)); JAG1 (Jagged1 (Alagille syndrome)); JAG2 (Jagged 2); KAI1 (Kangai 1 (suppression of tumorigenicity 6, prostate); CD82 antigen (R2 leukocyte antigen, antigen detected by monoclonal and antibody IA4)); KDR (Kinase insert domain receptor (a type III receptor tyrosine kinase)); LAG3 (Lymphocyte-activation gene 3); LAMA1 (Laminin, alpha 1); LAMA2 (Laminin, alpha 2 (merosin, congenital muscular dystrophy)); LAMA4 (Laminin, alpha 4); LAMA5 (Laminin, alpha 5); LY64 (Lymphocyte antigen 64 (mouse) homolog, radioprotective, 105kD); LYZ (Lysozyme (renal amyloidosis)); MDU1 (Antigen identified by monoclonal antibodies 4F2, TRA1.10, TROP4, and T43); MET (Met proto-oncogene (hepatocyte growth factor receptor)); MIC2 (Antigen identified by monoclonal antibodies 12E7, F21 and O13); MICA (MHC class I polypeptide-related sequence A); MME (Membrane metallo-endopeptidase (neutral endopeptidase, enkephalinase, CALLA, CD10)); MMP1 (Matrix metalloproteinase 1 (interstitial collagenase)); MMP10 (Matrix metalloproteinase 10 (stromelysin 2)); MMP2 (Matrix metalloproteinase 2 (gelatinase A, 72kD gelatinase, 72kD type IV collagenase)); MMP9 (Matrix metalloproteinase 9 (gelatinase B, 92kD gelatinase, 92kD type IV collagenase)); NEO1 (Neogenin (chicken) homolog 1); NOS2A (Nitric oxide synthase 2A (inducible, hepatocytes)); NOS3 (Nitric oxide synthase 3 (endothelial cell)); NRP1 (Neuropilin 1); NRP2 (Neuropilin 2); PAI1 (Plasminogen activator inhibitor, type I); PAI2 (Plasminogen activator inhibitor, type II (arginine-serpin)); PDNPI (Phosphodiesterase I/nucleotide pyrophosphatase 1 (homologous to mouse Ly-41 antigen)); PF4 (Platelet factor 4); PF4V1 (Platelet factor 4 variant 1); PLAU (Plasminogen activator, urokinase); PLAUR (Plasminogen activator, urokinase receptor); PLG (Plasminogen); PRKCA (Protein kinase C, alpha); PRKCB1 (Protein kinase C, beta 1); PRKM1 (Protein kinase, mitogen-activated 1 (MAP kinase 1; p40, p41)); PRKM10 (Protein kinase mitogen-activated 10 (MAP kinase)); PRKM3 (Protein kinase, mitogen-activated 3 (MAP kinase 3; p44)); PTAFR (Platelet-activating factor receptor); PTCH (Patched (Drosophila) homolog); PTK2 (PTK2 protein tyrosine kinase 2); PTK2B (Protein tyrosine kinase 2 beta); RHO (Rhodopsin (retinitis pigmentosa 4, autosomal dominant)); RTN1 (Reticulon 1); SDC1 (Syndecan 1); SDC2 (Syndecan 2 (heparan sulfate proteoglycan 1, cell surface-associated, fibroglycan)); SDC4 (Syndecan 4 (amphiglycan, ryudocan)); SELPLG (Selectin P ligand); SIAT1 (Sialyltransferase 1 (beta-galactoside alpha-2,6-sialyltransferase)); SLAM (Signaling lymphocytic activation molecule); SOS1 (Son of sevenless (Drosophila) homolog 1); SST (Somatostatin); SSTR1 (Somatostatin receptor 1); SSTR2 (Somatostatin receptor 2); SSTR3 (Somatostatin receptor 3); SSTR4 (Somatostatin receptor 4); SSTR5 (Somatostatin receptor 5); ST2 (Suppression of tumorigenicity 2); STAT1 (Signal transducer and activator of transcription 1, 91kD); TEK (TEK tyrosine kinase, endothelial); TFPI (Tissue

Apoptosis

Behavior

Cell cycle

ABL2 (V-abl Abelson murine leukemia viral oncogene homolog 2 (arg, Abelson-related gene)); ACP1 (Acid phosphatase 1, soluble); ACP2 (Acid phosphatase 2, lysosomal); ACP5 (Acid phosphatase 5, tartrate resistant); ACPP (Acid phosphatase, prostate); ACVR1B (Activin A receptor, type IB); ADK (Adenosine kinase); ADRBK1 (Adrenergic, beta, receptor kinase 1); AK1 (Adenylylate kinase 1); AK2 (Adenylylate kinase 2); AK3 (Adenylylate kinase 3); AKT1 (V-akt murine thymoma viral oncogene homolog 1); AKT2 (V-akt murine

thymoma viral oncogene homolog 2); ALPI (Alkaline phosphatase, intestinal); ALPL (Alkaline phosphatase, liver/bone/kidney); ALPP (Alkaline phosphatase, placental (Regan isozyme)); ARAF1 (V-raf murine sarcoma 3611 viral oncogene homolog 1); BLK (B lymphoid tyrosine kinase); BMPR2 (Bone morphogenetic protein receptor, type II (serine/threonine kinase)); BMX (BMX non-receptor tyrosine kinase); BRAF (V-raf murine sarcoma viral oncogene homolog B1); BTK (Bruton agammaglobulinemia tyrosine kinase); CAK (Cell adhesion kinase); CALM1 (Calmodulin 1 (phosphorylase kinase, delta)); CAMK4 (Calcium/calmodulin-dependent protein kinase IV); CBFA2T1 (Core-binding factor, runt domain, alpha subunit 2; translocated to, 1; cyclin D-related); CBFA2T2 (Core-binding factor, runt domain, alpha subunit 2; translocated to, 2); CBFA2T3 (Core-binding factor, runt domain, alpha subunit 2; translocated to, 3); CCNA2 (Cyclin A2); CCNB1 (Cyclin B1); CCND1 (Cyclin D1 (PRAD1: parathyroid adenomatosis 1)); CCND2 (Cyclin D2); CCND3 (Cyclin D3); CCNE1 (Cyclin E1); CCNE2 (Cyclin E2); CCNF (Cyclin F); CCNH (Cyclin H); CCNK (Cyclin K); CD48 (CD48 antigen (B-cell membrane protein)); CD69 (CD69 antigen (p60, early T-cell activation antigen)); CDC10 (Cell division cycle 10 (homologous to CDC10 of *S. cerevisiae*)); CDC18L (CDC18 (cell division cycle 18, *S. pombe*, homolog)-like); CDC2 (Cell division cycle 2, G1 to S and G2 to M); CDC25A (Cell division cycle 25A); CDC25A (Cell division cycle 25A); CDC25C (Cell division cycle 25C); CDC25C (Cell division cycle 25C); CDC27 (Cell division cycle 27); CDC2L1 (Cell division cycle 2-like 1 (PITSLRE proteins)); CDC42 (Cell division cycle 42 (GTP-binding protein, 25kD)); CDC7L1 (CDC7 (cell division cycle 7, *S. cerevisiae*, homolog)-like 1); CDK2 (Cyclin-dependent kinase 2); CDK2 (Cyclin-dependent kinase 2); CDK5 (Cyclin-dependent kinase 5); CDK6 (Cyclin-dependent kinase 6); CDK6 (Cyclin-dependent kinase 6); CDK7 (Cyclin-dependent kinase 7 (homolog of *Xenopus* MO15 cdk-activating kinase)); CDK7 (Cyclin-dependent kinase 7 (homolog of *Xenopus* MO15 cdk-activating kinase)); CDK8 (Cyclin-dependent kinase 8); CDK8 (Cyclin-dependent kinase 8); CDKN1B (Cyclin-dependent kinase inhibitor 1B (p27, Kip1)); CDKN1C (Cyclin-dependent kinase inhibitor 1C (p57, Kip2)); CDKN2B (Cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)); CHC1 (Chromosome condensation 1); CHEK1 (CHK1 (checkpoint, *S. pombe*) homolog); CHES1 (Checkpoint suppressor 1); CHUK (Conserved helix-loop-helix ubiquitous kinase); CKS1 (CDC28 protein kinase 1); CKS2 (CDC28 protein kinase 2); CLK2 (CDC-like kinase 2); CLK3 (CDC-like kinase 3); CNK (Cytokine-inducible kinase); COT (Cot (cancer Osaka thyroid) oncogene); CSNK1A1 (Casein kinase 1, alpha 1); CSNK1D (Casein kinase 1, delta); CSNK1E (Casein kinase 1, epsilon); CSNK2A2 (Casein kinase 2, alpha prime polypeptide); CSNK2B (Casein kinase 2, beta polypeptide); DENR (Density-regulated protein); DGKA (Diacylglycerol kinase, alpha (80kD)); DGKG (Diacylglycerol kinase, gamma (90kD)); DGKQ (Diacylglycerol kinase, theta (110kD)); DMPK (Dystrophin myotonic-protein kinase); DUSP3 (Dual specificity phosphatase 3 (vaccinia virus phosphatase VH1-related)); DUSP4 (Dual specificity phosphatase 4); DYRK1 (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1); E2F2 (E2F transcription factor 2); E2F5 (E2F transcription factor 5, p130-binding); EFNA1 (Ephrin-A1); EFNA5 (Ephrin-A5); EFN1 (Ephrin-B1); EFN2 (Ephrin-B2); EGR1 (Early growth response 1); EPHA2 (EphA2); EPHA4 (EphA4); EPHA5 (EphA5); EPHA7 (EphA7); EPHB3 (EphB3); EPHB4 (EphB4); EPHB6 (EphB6); ERBB3 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 3); FAP (Fibroblast activation protein, alpha); FBL (Fibrillarin); FES (Feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fps) oncogene homolog); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR2 (Fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome, Pfeiffer syndrome, Jackson-Weiss syndrome)); FGR (Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog); FLT1 (Fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)); FLT3LG (Fms-related tyrosine kinase 3 ligand); FLT4 (Fms-related tyrosine kinase 4); FRK (Fyn-related kinase); GAS2 (Growth arrest-specific 2); GLA (Galactosidase, alpha); GPRK6 (G protein-coupled receptor kinase 6); GSPT1 (G1 to S phase transition 1); HMR (Hormone receptor (growth factor-inducible nuclear protein N10)); HUS1 (HUS1 (*S. pombe*) checkpoint homolog); IFI56 (Interferon-induced protein 56); IGFBP1 (Insulin-like growth factor binding protein 1); ILK (Integrin-linked kinase); INP10 (Interferon (gamma)-induced cell line; protein 10 from); INPP5D (Inositol polyphosphate-5-phosphatase, 145kD); ISG20 (Interferon stimulated gene (20kD)); JAK1 (Janus kinase 1 (a protein tyrosine kinase)); JAK3 (Janus kinase 3 (a protein tyrosine kinase, leukocyte)); KDR (Kinase insert domain receptor (a type III receptor tyrosine kinase)); LCAT (Lecithin-cholesterol acyltransferase); LIMK1 (LIM domain kinase 1); LIMK2 (LIM domain kinase 2); LRP1 (Low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)); LTK (Leukocyte tyrosine kinase); LY6E (Lymphocyte antigen 6 complex, locus E); MAD1L1 (MAD1 (mitotic arrest deficient, yeast, homolog)-like 1); MAD2L1 (MAD2 (mitotic arrest deficient, yeast, homolog)-like 1); MATK (Megakaryocyte-associated tyrosine kinase); MCL1 (Myeloid cell leukemia sequence 1 (BCL2-related)); MCM4 (Minichromosome maintenance deficient (*S. cerevisiae*) 4); MEKK3 (MAP/ERK kinase kinase 3); MEKK5 (MAP/ERK kinase kinase 5); MKI67 (Antigen identified by monoclonal antibody Ki-67); MST1R (Macrophage stimulating 1 receptor (c-met-related tyrosine kinase)); NCK1 (NCK adaptor protein 1); NEK3 (NIMA (never in mitosis gene a)-related kinase); NME1 (Non-metastatic cells 1, protein (NM23A) expressed in); NME2 (Non-metastatic cells 2, protein (NM23B) expressed in); NOS2A (Nitric oxide synthase 2A (inducible, hepatocytes)); NPM1 (Nucleophosmin (nucleolar phosphoprotein B23, numatrin)); NTRK3 (Neurotrophic tyrosine kinase, receptor, type 3); OAS1 (2',5'-oligoadenylate synthetase 1); PA2G4

(Proliferation-associated 2G4, 38kD); PCNA (Proliferating cell nuclear antigen); PCTK3 (PCTAIRE protein kinase 3); PDGFRB (Platelet-derived growth factor receptor, beta polypeptide); PDK2 (Pyruvate dehydrogenase kinase, isoenzyme 2); PDK4 (Pyruvate dehydrogenase kinase, isoenzyme 4); PDPK1 (3-phosphoinositide dependent protein kinase-1); PHKA2 (Phosphorylase kinase, alpha 2 (liver), glycogen storage disease IX); PHKG2 (Phosphorylase kinase, gamma 2 (testis)); PIK3CA (Phosphoinositide-3-kinase, catalytic, alpha polypeptide); PIK3CG (Phosphoinositide-3-kinase, catalytic, gamma polypeptide); PIM1 (Pim-1 oncogene); POLB (Polymerase (DNA directed), beta); POLD1 (Polymerase (DNA directed), delta 1, catalytic subunit (125kD)); PPP1CA (Protein phosphatase 1, catalytic subunit, alpha isoform); PPP1CB (Protein phosphatase 1, catalytic subunit, beta isoform); PPP1CC (Protein phosphatase 1, catalytic subunit, gamma isoform); PPP1R3 (Protein phosphatase 1, regulatory (inhibitor) subunit 3 (glycogen and sarcoplasmic reticulum binding subunit skeletal muscle)); PPP2CA (Protein phosphatase 2 (formerly 2A), catalytic subunit, alpha isoform); PPP2R1B (Protein phosphatase 2 (formerly 2A), regulatory subunit A (PR 65), beta isoform); PPP2R2A (Protein phosphatase 2 (formerly 2A), regulatory subunit B (PR 52), alpha isoform); PPP2R3 (Protein phosphatase 2 (formerly 2A), regulatory subunit B' (PR 72), alpha isoform and (PR 130), beta isoform); PPP2R4 (Protein phosphatase 2A, regulatory subunit B' (PR 53)); PPP2R5A (Protein phosphatase 2, regulatory subunit B (B56), alpha isoform); PPP2R5B (Protein phosphatase 2, regulatory subunit B (B56), beta isoform); PPP2R5D (Protein phosphatase 2, regulatory subunit B (B56), delta isoform); PPP2R5E (Protein phosphatase 2, regulatory subunit B (B56), epsilon isoform); PPP3CA (Protein phosphatase 3 (formerly 2B), catalytic subunit, alpha isoform (calcineurin A alpha)); PPP3CB (Protein phosphatase 3 (formerly 2B), catalytic subunit, beta isoform (calcineurin A beta)); PPP4C (Protein phosphatase 4 (formerly X), catalytic subunit); PRKAA2 (Protein kinase, AMP-activated, alpha 2 catalytic subunit); PRKACA (Protein kinase, cAMP-dependent, catalytic, alpha); PRKACB (Protein kinase, cAMP-dependent, catalytic, beta); PRKACG (Protein kinase, cAMP-dependent, catalytic, gamma); PRKAG1 (Protein kinase, AMP-activated, gamma 1 non-catalytic subunit); PRKARIA (Protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)); PRKAR1B (Protein kinase, cAMP-dependent, regulatory, type I, beta); PRKAR2B (Protein kinase, cAMP-dependent, regulatory, type II, beta); PRKCA (Protein kinase C, alpha); PRKCB1 (Protein kinase C, beta 1); PRKCG (Protein kinase C, gamma); PRKCI (Protein kinase C, iota); PRKCL1 (Protein kinase C-like 1); PRKCL2 (Protein kinase C-like 2); PRKCM (Protein kinase C, mu); PRKCQ (Protein kinase C, theta); PRKCZ (Protein kinase C, zeta); PRKG1 (Protein kinase, cGMP-dependent, type I); PRKG2 (Protein kinase, cGMP-dependent, type II); PRKM1 (Protein kinase, mitogen-activated 1 (MAP kinase 1; p40, p41)); PRKM10 (Protein kinase mitogen-activated 10 (MAP kinase)); PRKM11 (Protein kinase mitogen-activated 11); PRKM13 (Protein kinase mitogen-activated 13); PRKM3 (Protein kinase, mitogen-activated 3 (MAP kinase 3; p44)); PRKM6 (Protein kinase, mitogen-activated 6 (extracellular signal-regulated kinase, p97)); PRKM7 (Protein kinase mitogen-activated 7 (MAP kinase)); PRKM8 (Protein kinase mitogen-activated 8 (MAP kinase)); PRKM9 (Protein kinase mitogen-activated 9 (MAP kinase)); PRKMK2 (Protein kinase, mitogen-activated, kinase 2, p45 (MAP kinase kinase 2)); PRKMK3 (Protein kinase, mitogen-activated, kinase 3 (MAP kinase kinase 3)); PRKMK5 (Protein kinase, mitogen-activated, kinase 5 (MAP kinase kinase 5)); PRKMK7 (Protein kinase, mitogen-activated, kinase 7 (MAP kinase kinase 7)); PRKR (Protein kinase, interferon-inducible double stranded RNA dependent); PTEN (Phosphatase and tensin homolog (mutated in multiple advanced cancers 1)); PTK7 (PTK7 protein tyrosine kinase 7); PTK9 (Protein tyrosine kinase 9); PTPN1 (Protein tyrosine phosphatase, non-receptor type 1); PTPN12 (Protein tyrosine phosphatase, non-receptor type 12); PTPN13 (Protein tyrosine phosphatase, non-receptor type 13 (APO-1/CD95 (Fas)-associated phosphatase)); PTPN2 (Protein tyrosine phosphatase, non-receptor type 2); PTPN3 (Protein tyrosine phosphatase, non-receptor type 3); PTPN4 (Protein tyrosine phosphatase, non-receptor type 4 (megakaryocyte)); PTPN6 (Protein tyrosine phosphatase, non-receptor type 6); PTPN7 (Protein tyrosine phosphatase, non-receptor type 7); PTPN9 (Protein tyrosine phosphatase, non-receptor type 9); PTPRA (Protein tyrosine phosphatase, receptor type, alpha polypeptide); PTPRB (Protein tyrosine phosphatase, receptor type, beta polypeptide); PTPRC (Protein tyrosine phosphatase, receptor type, c polypeptide); PTPRD (Protein tyrosine phosphatase, receptor type, D); PTPRF (Protein tyrosine phosphatase, receptor type, F); PTPRG (Protein tyrosine phosphatase, receptor type, gamma polypeptide); PTPRH (Protein tyrosine phosphatase, receptor type, H); PTPRK (Protein tyrosine phosphatase, receptor type, K); PTPRM (Protein tyrosine phosphatase, receptor type, M); PTPRN (Protein tyrosine phosphatase, receptor type, N); PTPRN2 (Protein tyrosine phosphatase, receptor type, N polypeptide 2); PTX3 (Pentaxin-related gene, rapidly induced by IL-1 beta); RAB8IP (Rab8 interacting protein (GC kinase)); RAB8IP (Rab8 interacting protein (GC kinase)); RAD9 (RAD9 (S. pombe) homolog); RAD9 (RAD9 (S. pombe) homolog); RBL1 (Retinoblastoma-like 1 (p107)); RET (Ret proto-oncogene (multiple endocrine neoplasia MEN2A, MEN2B and medullary thyroid carcinoma 1, Hirschsprung disease)); RHOK (Rhodopsin kinase); ROCK1 (Rho-associated, coiled-coil containing protein kinase 1); RPS6KA2 (Ribosomal protein S6 kinase, 90kD, polypeptide 2); RPS6KB1 (Ribosomal protein S6 kinase, 70kD, polypeptide 1); RYK (RYK receptor-like tyrosine kinase); SAPK3 (Stress-activated protein kinase 3); SERK1 (SAPK/Erk kinase 1); SRC (V-src avian sarcoma (Schmidt-Ruppin A-2) viral oncogene homolog); SRF (Serum response factor (c-fos serum response element-binding transcription factor)); SRPK2 (SFRS protein kinase 2); STK11 (Serine/threonine kinase 11 (Peutz-Jeghers syndrome)); STK2 (Serine/threonine kinase 2); STK3 (Serine/threonine kinase 3 (Ste20, yeast homolog)); STK4 (Serine/threonine kinase 4); SYK (Spleen tyrosine

kinase); TCEB1L (Transcription elongation factor B (SIH), polypeptide 1-like); TESK1 (Testis-specific kinase 1); TFDP2 (Transcription factor Dp-2 (E2F dimerization partner 2)); TGFBI (Transforming growth factor, beta-induced, 68kD); TIEG (TGFB inducible early growth response); TK2 (Thymidine kinase 2, mitochondrial); TNFAIP1 (Tumor necrosis factor, alpha-induced protein 1 (endothelial)); TNFSF5 (Tumor necrosis factor (ligand) superfamily, member 5); TS546 (Temperature sensitivity complementation, cell cycle specific); TTK (TTK protein kinase); TXK (TXK tyrosine kinase); TYK2 (Tyrosine kinase 2); TYRO3 (TYRO3 protein tyrosine kinase); VRK2 (Vaccinia related kinase 2); ZAP70 (Zeta-chain (TCR) associated protein kinase (70 kD)); and ZPK (Zipper (leucine) protein kinase).

Cell signaling

ABL1 (V-abl Abelson murine leukemia viral oncogene homolog 1); ABL2 (V-abl Abelson murine leukemia viral oncogene homolog 2 (arg, Abelson-related gene)); ABR (Active BCR-related gene); ACP1 (Acid phosphatase 1, soluble); ACP2 (Acid phosphatase 2, lysosomal); ACP5 (Acid phosphatase 5, tartrate resistant); ACPP (Acid phosphatase, prostate); ACTG1 (Actin, gamma 1); ACVR1B (Activin A receptor, type IB); ADD3 (Adducin 3 (gamma)); ADK (Adenosine kinase); ADRBK1 (Adrenergic, beta, receptor kinase 1); AIF1 (Allograft inflammatory factor 1); AK1 (Adenylate kinase 1); AK2 (Adenylate kinase 2); AK3 (Adenylate kinase 3); AKT1 (V-akt murine thymoma viral oncogene homolog 1); AKT2 (V-akt murine thymoma viral oncogene homolog 2); ALCAM (Activated leucocyte cell adhesion molecule); ALOX12 (Arachidonate 12-lipoxygenase); ALOX5 (Arachidonate 5-lipoxygenase); ALPI (Alkaline phosphatase, intestinal); ALPL (Alkaline phosphatase, liver/bone/kidney); ALPP (Alkaline phosphatase, placental (Regan isozyme)); ANK1 (Ankyrin 1, erythrocytic); ANT2 (Adenine nucleotide translocator 2 (fibroblast)); ARAF1 (V-raf murine sarcoma 3611 viral oncogene homolog 1); ARHA (Ras homolog gene family, member A); ARHC (Ras homolog gene family, member C); ARHGDIB (Rho GDP dissociation inhibitor (GDI) beta); BLK (B lymphoid tyrosine kinase); BMPR2 (Bone morphogenetic protein receptor, type II (serine/threonine kinase)); BMX (BMX non-receptor tyrosine kinase); BRAF (V-raf murine sarcoma viral oncogene homolog B1); BTK (Bruton agammaglobulinemia tyrosine kinase); CAK (Cell adhesion kinase); CALM1 (Calmodulin 1 (phosphorylase kinase, delta)); CAMK4 (Calcium/calmodulin-dependent protein kinase IV); CBLB (Cas-Br-M (murine) ectropic retroviral transforming sequence b); CD44 (CD44 antigen (homing function and Indian blood group system)); CD47 (CD47 antigen (Rh-related antigen, integrin-associated signal transducer)); CD48 (CD48 antigen (B-cell membrane protein)); CD58 (CD58 antigen, (lymphocyte function-associated antigen 3)); CD69 (CD69 antigen (p60, early T-cell activation antigen)); CDC25A (Cell division cycle 25A); CDC25C (Cell division cycle 25C); CDC2L1 (Cell division cycle 2-like 1 (PITSLRE proteins)); CDC42 (Cell division cycle 42 (GTP-binding protein, 25kD)); CDC42 (Cell division cycle 42 (GTP-binding protein, 25kD)); CDC7L1 (CDC7 (cell division cycle 7, *S. cerevisiae*, homolog)-like 1); CDH13 (Cadherin 13, H-cadherin (heart)); CDH17 (Cadherin 17, LI cadherin (liver-intestine)); CDH2 (Cadherin 2, N-cadherin (neuronal)); CDH4 (Cadherin 4, R-cadherin (retinal)); CDH5 (Cadherin 5, VE-cadherin (vascular epithelium)); CDK2 (Cyclin-dependent kinase 2); CDK5 (Cyclin-dependent kinase 5); CDK6 (Cyclin-dependent kinase 6); CDK7 (Cyclin-dependent kinase 7 (homolog of *Xenopus* MO15 cdk-activating kinase)); CDK8 (Cyclin-dependent kinase 8); CDKN2B (Cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)); CHEK1 (CHK1 (checkpoint, *S.pombe*) homolog); CHUK (Conserved helix-loop-helix ubiquitous kinase); CKS1 (CDC28 protein kinase 1); CKS2 (CDC28 protein kinase 2); CLGN (Calmequin); CLK2 (CDC-like kinase 2); CLK3 (CDC-like kinase 3); CLTB (Clathrin, light polypeptide (Lcb)); CNK (Cytokine-inducible kinase); COT (Cot (cancer Osaka thyroid) oncogene); CSNK1A1 (Casein kinase 1, alpha 1); CSNK1D (Casein kinase 1, delta); CSNK1E (Casein kinase 1, epsilon); CSNK2A2 (Casein kinase 2, alpha prime polypeptide); CSNK2B (Casein kinase 2, beta polypeptide); CTNNA1 (Catenin (cadherin-associated protein), alpha 1 (102kD)); CTNNB1 (Catenin (cadherin-associated protein), beta 1 (88kD)); CTNND2 (Catenin (cadherin-associated protein), delta 2 (neural plakophilin-related arm-repeat protein)); DAPK1 (Death-associated protein kinase 1); DGKA (Diacylglycerol kinase, alpha (80kD)); DGKG (Diacylglycerol kinase, gamma (90kD)); DGKQ (Diacylglycerol kinase, theta (110kD)); DMPK (Dystrophin myotonia-protein kinase); DUSP3 (Dual specificity phosphatase 3 (vaccinia virus phosphatase VH1-related)); DUSP4 (Dual specificity phosphatase 4); DVL3 (Dishevelled 3 (homologous to *Drosophila* dsh)); DYRK1 (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1); EFNA1 (Ephrin-A1); EFNA5 (Ephrin-A5); EFN1B1 (Ephrin-B1); EFN1B2 (Ephrin-B2); EGRI (Early growth response 1); EGR3 (Early growth response 3); EGR4 (Early growth response 4); EPHA2 (EphA2); EPHA4 (EphA4); EPHA5 (EphA5); EPHA7 (EphA7); EPHB3 (EphB3); EPHB4 (EphB4); EPHB6 (EphB6); ERBB3 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 3); FAP (Fibroblast activation protein, alpha); FAT (FAT tumor suppressor (*Drosophila*) homolog); FBL (Fibrillarin); FES (Feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fps) oncogene homolog); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR2 (Fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome, Pfeiffer syndrome, Jackson-Weiss syndrome)); FGR (Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog); FLNA (Filamin A, alpha (actin-binding protein-280)); FLT1 (Fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)); FLT3LG (Fms-related tyrosine kinase 3 ligand); FLT4 (Fms-

related tyrosine kinase 4); FN1 (Fibronectin 1); FRK (Fyn-related kinase); FYB (FYN-binding protein (FYB-120/130)); G1P3 (Interferon, alpha-inducible protein (clone IFI-6-16)); GBP1 (Guanylate binding protein 1; interferon-inducible, 67kD); GBP2 (Guanylate binding protein 2, interferon-inducible); GJB1 (Gap junction protein, beta 1, 32kD (connexin 32, Charcot-Marie-Tooth neuropathy, X-linked)); GLA (Galactosidase, alpha); GNAI1 (Guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 1); GNG10 (Guanine nucleotide binding protein 10); GPRK6 (G protein-coupled receptor kinase 6); GRB2 (Growth factor receptor-bound protein 2); HMMR (Hyaluronan-mediated motility receptor (RHAMM)); HMR (Hormone receptor (growth factor-inducible nuclear protein N10)); ICAM1 (Intercellular adhesion molecule 1 (CD54), human rhinovirus receptor); ICAM2 (Intercellular adhesion molecule 2); ICAM3 (Intercellular adhesion molecule 3); IFI16 (Interferon, gamma-inducible protein 16); IFI56 (Interferon-induced protein 56); IFIT4 (Interferon-induced protein with tetratricopeptide repeats 4); IGFBP1 (Insulin-like growth factor binding protein 1); ILK (Integrin-linked kinase); INP10 (Interferon (gamma)-induced cell line; protein 10 from); INPP5D (Inositol polyphosphate-5-phosphatase, 145kD); ISG20 (Interferon stimulated gene (20kD)); ITGA2 (Integrin, alpha 2 (CD49B, alpha 2 subunit of VLA-2 receptor)); ITGA3 (Integrin, alpha 3 (antigen CD49C, alpha 3 subunit of VLA-3 receptor)); ITGA4 (Integrin, alpha 4 (antigen CD49D, alpha 4 subunit of VLA-4 receptor)); ITGA5 (Integrin, alpha 5 (fibronectin receptor, alpha polypeptide)); ITGA6 (Integrin, alpha 6); ITGA7 (Integrin, alpha 7); ITGA9 (Integrin, alpha 9); ITGAE (Integrin, alpha E (antigen CD103, human mucosal lymphocyte antigen 1; alpha polypeptide)); ITGAL (Integrin, alpha L (antigen CD11A (p180), lymphocyte function-associated antigen 1; alpha polypeptide)); ITGAM (Integrin, alpha M (complement component receptor 3, alpha; also known as CD11b (p170), macrophage antigen alpha polypeptide)); ITGAV (Integrin, alpha V (vitronectin receptor, alpha polypeptide, antigen CD51)); ITGAX (Integrin, alpha X (antigen CD11C (p150), alpha polypeptide)); ITGB1 (Integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)); ITGB2 (Integrin, beta 2 (antigen CD18 (p95), lymphocyte function-associated antigen 1; macrophage antigen 1 (mac-1) beta subunit)); ITGB3 (Integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)); ITGB4 (Integrin, beta 4); ITGB5 (Integrin, beta 5); ITGB7 (Integrin, beta 7); ITGB8 (Integrin, beta 8); ITPKB (Inositol 1,4,5-trisphosphate 3-kinase B); JAK1 (Janus kinase 1 (a protein tyrosine kinase)); JAK3 (Janus kinase 3 (a protein tyrosine kinase, leukocyte)); KCNN3 (Potassium intermediate/small conductance calcium-activated channel, subfamily N, member 3); KDR (Kinase insert domain receptor (a type III receptor tyrosine kinase)); KPNB1 (Karyopherin (importin) beta 1); LCAT (Lecithin-cholesterol acyltransferase); LIMK1 (LIM domain kinase 1); LIMK2 (LIM domain kinase 2); LRP1 (Low density lipoprotein-related protein 1 (alpha-2 macroglobulin receptor)); LTK (Leukocyte tyrosine kinase); LY6E (Lymphocyte antigen 6 complex, locus E); MADH1 (MAD (mothers against decapentaplegic, Drosophila) homolog 1); MADH2 (MAD (mothers against decapentaplegic, Drosophila) homolog 2); MADH3 (MAD (mothers against decapentaplegic, Drosophila) homolog 3); MAP1B (Microtubule-associated protein 1B); MATK (Megakaryocyte-associated tyrosine kinase); MCL1 (Myeloid cell leukemia sequence 1 (BCL2-related)); MEKK3 (MAP/ERK kinase kinase 3); MEKK5 (MAP/ERK kinase kinase 5); MST1R (Macrophage stimulating 1 receptor (c-met-related tyrosine kinase)); MX1 (Myxovirus (influenza) resistance 1, homolog of murine (interferon-inducible protein p78)); MX2 (Myxovirus (influenza) resistance 2, homolog of murine); MYL2 (Myosin, light polypeptide 2, regulatory, cardiac, slow); MYL3 (Myosin, light polypeptide 3, alkali; ventricular, skeletal, slow); NCAM1 (Neural cell adhesion molecule 1); NCK1 (NCK adaptor protein 1); NEK3 (NIMA (never in mitosis gene a)-related kinase); NME1 (Non-metastatic cells 1, protein (NM23A) expressed in); NME2 (Non-metastatic cells 2, protein (NM23B) expressed in); NOS2A (Nitric oxide synthase 2A (inducible, hepatocytes)); NPM1 (Nucleophosmin (nucleolar phosphoprotein B23, numatrin)); NTRK3 (Neurotrophic tyrosine kinase, receptor, type 3); OAS1 (2',5'-oligoadenylate synthetase 1); OCLN (Occludin); PCDH1 (Protocadherin 1 (cadherin-like 1)); PCTK3 (PCTAIRE protein kinase 3); PDE4B (Phosphodiesterase 4B, cAMP-specific (dunce (Drosophila)-homolog phosphodiesterase E4)); PDGFRB (Platelet-derived growth factor receptor, beta polypeptide); PDK2 (Pyruvate dehydrogenase kinase, isoenzyme 2); PDK4 (Pyruvate dehydrogenase kinase, isoenzyme 4); PDPK1 (3-phosphoinositide dependent protein kinase-1); PECAM1 (Platelet/endothelial cell adhesion molecule (CD31 antigen)); PGY3 (P glycoprotein 3/multiple drug resistance 3); PHKA2 (Phosphorylase kinase, alpha 2 (liver), glycogen storage disease IX); PHKG2 (Phosphorylase kinase, gamma 2 (testis)); PIK3C3 (Phosphoinositide-3-kinase, class 3); PIK3CA (Phosphoinositide-3-kinase, catalytic, alpha polypeptide); PIK3CG (Phosphoinositide-3-kinase, catalytic, gamma polypeptide); PIM1 (Pim-1 oncogene); PKD1 (Polycystic kidney disease 1 (autosomal dominant)); PLA2G2A (Phospholipase A2, group IIA (platelets, synovial fluid)); PLCB4 (Phospholipase C, beta 4); PLCE (Phospholipase C, epsilon); PLCG2 (Phospholipase C, gamma 2 (phosphatidylinositol-specific)); PPP1CA (Protein phosphatase 1, catalytic subunit, alpha isoform); PPP1CB (Protein phosphatase 1, catalytic subunit, beta isoform); PPP1CC (Protein phosphatase 1, catalytic subunit, gamma isoform); PPP1R3 (Protein phosphatase 1, regulatory (inhibitor) subunit 3 (glycogen and sarcoplasmic reticulum binding subunit, skeletal muscle)); PPP2CA (Protein phosphatase 2 (formerly 2A), catalytic subunit, alpha isoform); PPP2R1B (Protein phosphatase 2 (formerly 2A), regulatory subunit B (PR 52), alpha isoform); PPP2R3 (Protein phosphatase 2 (formerly 2A), regulatory subunit B' (PR 72), alpha isoform and (PR 130) beta isoform); PPP2R4 (Protein phosphatase 2A, regulatory subunit B' (PR 53)); PPP2R5A

(Protein phosphatase 2, regulatory subunit B (B56), alpha isoform); PPP2R5B (Protein phosphatase 2, regulatory subunit B (B56), beta isoform); PPP2R5D (Protein phosphatase 2, regulatory subunit B (B56), delta isoform); PPP2R5E (Protein phosphatase 2, regulatory subunit B (B56), epsilon isoform); PPP3CA (Protein phosphatase 3 (formerly 2B), catalytic subunit, alpha isoform (calcineurin A alpha)); PPP3CB (Protein phosphatase 3 (formerly 2B), catalytic subunit, beta isoform (calcineurin A beta)); PPP4C (Protein phosphatase 4 (formerly X), catalytic subunit); PRKAA2 (Protein kinase, AMP-activated, alpha 2 catalytic subunit); PRKACA (Protein kinase, cAMP-dependent, catalytic, alpha); PRKACB (Protein kinase, cAMP-dependent, catalytic, beta); PRKACG (Protein kinase, cAMP-dependent, catalytic, gamma); PRKAG1 (Protein kinase, AMP-activated, gamma 1 non-catalytic subunit); PRKARIA (Protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)); PRKAR1B (Protein kinase, cAMP-dependent, regulatory, type I, beta); PRKAR2B (Protein kinase, cAMP-dependent, regulatory, type II, beta); PRKCA (Protein kinase C, alpha); PRKCB1 (Protein kinase C, beta 1); PRKCG (Protein kinase C, gamma); PRKCI (Protein kinase C, iota); PRKCL1 (Protein kinase C-like 1); PRKCL2 (Protein kinase C-like 2); PRKCM (Protein kinase C, mu); PRKCQ (Protein kinase C, theta); PRKCZ (Protein kinase C, zeta); PRKG1 (Protein kinase, cGMP-dependent, type I); PRKG2 (Protein kinase, cGMP-dependent, type II); PRKM1 (Protein kinase, mitogen-activated 1 (MAP kinase 1; p40, p41)); PRKM10 (Protein kinase mitogen-activated 10 (MAP kinase)); PRKM11 (Protein kinase mitogen-activated 11); PRKM13 (Protein kinase mitogen-activated 13); PRKM3 (Protein kinase, mitogen-activated 3 (MAP kinase 3; p44)); PRKM6 (Protein kinase, mitogen-activated 6 (extracellular signal-regulated kinase, p97)); PRKM7 (Protein kinase mitogen-activated 7 (MAP kinase)); PRKM8 (Protein kinase mitogen-activated 8 (MAP kinase)); PRKM9 (Protein kinase mitogen-activated 9 (MAP kinase)); PRKMK2 (Protein kinase, mitogen-activated, kinase 2, p45 (MAP kinase kinase 2)); PRKMK3 (Protein kinase, mitogen-activated, kinase 3 (MAP kinase kinase 3)); PRKMK5 (Protein kinase, mitogen-activated, kinase 5 (MAP kinase kinase 5)); PRKMK7 (Protein kinase, mitogen-activated, kinase 7 (MAP kinase kinase 7)); PRKR (Protein kinase, interferon-inducible double stranded RNA dependent); PRKR (Protein kinase, interferon-inducible double stranded RNA dependent); PSME1 (Proteasome (prosome, macropain) activator subunit 1 (PA28 alpha)); PTEN (Phosphatase and tensin homolog (mutated in multiple advanced cancers 1)); PTK7 (PTK7 protein tyrosine kinase 7); PTK9 (Protein tyrosine kinase 9); PTPN1 (Protein tyrosine phosphatase, non-receptor type 1); PTPN12 (Protein tyrosine phosphatase, non-receptor type 12); PTPN13 (Protein tyrosine phosphatase, non-receptor type 13 (APO-1/CD95 (Fas)-associated phosphatase)); PTPN2 (Protein tyrosine phosphatase, non-receptor type 2); PTPN3 (Protein tyrosine phosphatase, non-receptor type 3); PTPN4 (Protein tyrosine phosphatase, non-receptor type 4 (megakaryocyte)); PTPN6 (Protein tyrosine phosphatase, non-receptor type 6); PTPN7 (Protein tyrosine phosphatase, non-receptor type 7); PTPN9 (Protein tyrosine phosphatase, non-receptor type 9); PTPRA (Protein tyrosine phosphatase, receptor type, alpha polypeptide); PTPRB (Protein tyrosine phosphatase, receptor type, beta polypeptide); PTPRC (Protein tyrosine phosphatase, receptor type, c polypeptide); PTPRD (Protein tyrosine phosphatase, receptor type, D); PTPRF (Protein tyrosine phosphatase, receptor type, F); PTPRG (Protein tyrosine phosphatase, receptor type, gamma polypeptide); PTPRH (Protein tyrosine phosphatase, receptor type, H); PTPRK (Protein tyrosine phosphatase, receptor type, K); PTPRM (Protein tyrosine phosphatase, receptor type, M); PTPRN (Protein tyrosine phosphatase, receptor type, N); PTPRN2 (Protein tyrosine phosphatase, receptor type, N polypeptide 2); PTX3 (Pentaxin-related gene, rapidly induced by IL-1 beta); RAB8IP (Rab8 interacting protein (GC kinase)); RAB8IP (Rab8 interacting protein (GC kinase)); RAD9 (RAD9 (S. pombe) homolog); RASA1 (RAS p21 protein activator (GTPase activating protein) 1); RET (Ret proto-oncogene (multiple endocrine neoplasia MEN2A, MEN2B and medullary thyroid carcinoma 1, Hirschsprung disease)); RGS1 (Regulator of G-protein signalling 1); RGS16 (Regulator of G-protein signalling 16); RGS7 (Regulator of G-protein signalling 7); RHOK (Rhodopsin kinase); ROCK1 (Rho-associated, coiled-coil containing protein kinase 1); RPS6KA2 (Ribosomal protein S6 kinase, 90kD, polypeptide 2); RPS6KB1 (Ribosomal protein S6 kinase, 70kD, polypeptide 1); RSN (Restin (Reed-Steinberg cell-expressed intermediate filament-associated protein)); RYK (RYK receptor-like tyrosine kinase); SAPK3 (Stress-activated protein kinase 3); SELE (Selectin E (endothelial adhesion molecule 1)); SELL (Selectin L (lymphocyte adhesion molecule 1)); SELP (Selectin P (granule membrane protein 140kD, antigen CD62)); SERK1 (SAPK/Erk kinase 1); SFN (Stratifin); SH3D1B (SH3 domain protein 1B); SLC2A3 (Solute carrier family 2 (facilitated glucose transporter), member 3); SLC2A5 (Solute carrier family 2 (facilitated glucose transporter), member 5); SPTA1 (Spectrin, alpha, erythrocytic 1 (elliptocytosis 2)); SPTB (Spectrin, beta, erythrocytic (includes spherocytosis, clinical type I)); SRC (V-src avian sarcoma (Schmidt-Ruppin A-2) viral oncogene homolog); SRF (Serum response factor (c-fos serum response element-binding transcription factor)); SRPK2 (SFRS protein kinase 2); STK11 (Serine/threonine kinase 11 (Peutz-Jeghers syndrome)); STK2 (Serine/threonine kinase 2); STK3 (Serine/threonine kinase 3 (Ste20, yeast homolog)); STK4 (Serine/threonine kinase 4); SYK (Spleen tyrosine kinase); TAP1 (Transporter 1, ABC (ATP binding cassette)); TAPBP (TAP binding protein (tapasin)); TBCC (Tubulin-specific chaperone c); TESK1 (Testis-specific kinase 1); TGFBI (Transforming growth factor, beta-induced, 68kD); THBS1 (Thrombospondin 1); TIAM1 (T-cell lymphoma invasion and metastasis 1); TIEG (TGFB inducible early growth response); TK2 (Thymidine kinase 2, mitochondrial); TNFAIP1 (Tumor necrosis factor, alpha-induced protein 1 (endothelial)); TNFAIP1 (Tumor necrosis factor, alpha-induced protein 1 (endothelial)); TNFSF5 (Tumor necrosis factor (ligand) superfamily, member 5); TTK (TTK protein kinase);

TTN (Titin); TUBA1 (Tubulin, alpha 1 (testis specific)); TUBG (Tubulin, gamma polypeptide); TXK (TXK tyrosine kinase); TYK2 (Tyrosine kinase 2); TYRO3 (TYRO3 protein tyrosine kinase); UBE1L (Ubiquitin-activating enzyme E1, like); UBE2A (Ubiquitin-conjugating enzyme E2A (RAD6 homolog)); UBE2B (Ubiquitin-conjugating enzyme E2B (RAD6 homolog)); VASP (Vasodilator-stimulated phosphoprotein); VAV2 (Vav 2 oncogene); VCAM1 (Vascular cell adhesion molecule 1); VCL (Vinculin); VIM (Vimentin); VRK2 (Vaccinia related kinase 2); WAS (Wiskott-Aldrich syndrome (eczema-thrombocytopenia)); ZAP70 (Zeta-chain (TCR) associated protein kinase (70 kD)); and ZPK (Zipper (leucine) protein kinase).

Development

ACCPN (Agenesis of corpus callosum and peripheral neuropathy (Andermann)); ACVR1 (Activin A receptor, type I); ACVR1B (Activin A receptor, type IB); ACVR2 (Activin A receptor, type II); ACVR2B (Activin A receptor, type IIB); ACVRL1 (Activin A receptor type II-like 1); ADFN (Albinism-deafness syndrome); AES (Amino-terminal enhancer of split); AFD1 (Acrofacial dysostosis 1, Nager type); AGC1 (Aggrecan 1 (chondroitin sulfate proteoglycan 1, large aggregating proteoglycan, antigen identified by monoclonal antibody A0122)); AHO2 (Albright hereditary osteodystrophy-2); AIH3 (Amelogenesis imperfecta 3, hypomaturation or hypoplastic type); ALX3 (Aristaless-like homeobox 3); AMCD1 (Arthrogryposis multiplex congenita, distal, type 1); AMCD2B (Arthrogryposis multiplex congenita, distal, type 2B); AMCN (Arthrogryposis multiplex congenita, neurogenic); AMCX1 (Arthrogryposis multiplex congenita, X-linked (spinal muscular atrophy)); AMDM (Acromesomelic dysplasia, Maroteaux type); AMH (Anti-Mullerian hormone); AMHR2 (Anti-Mullerian hormone receptor, type II); AMMECR1 (Alport syndrome, mental retardation, midface hypoplasia and elliptocytosis chromosomal region, gene 1); ANOP1 (Anophthalmos 1 (with mental retardation, without limb anomalies or dental or urogenital abnormalities)); APC (Adenomatous polyposis coli); ARIX (Aristaless (Drosophila) homeobox); ARVCF (Armadillo repeat gene deletes in velocardiofacial syndrome); ASCL1 (Achaete-scute complex (Drosophila) homolog-like 1); ASCL2 (Achaete-scute complex (Drosophila) homolog-like 2); ASH2L (Ash2 (absent, small, or homeotic, Drosophila, homolog)-like); ASMD (Anterior segment mesenchymal dysgenesis); ATD (Asphyxiating thoracic dystrophy (chondroectodermal dysplasia-like syndrome)); ATF4 (Activating transcription factor 4 (tax-responsive enhancer element B67)); AXIN1 (Axin); AXIN2 (Axin 2 (conductin, axil)); BAD (BCL2-antagonist of cell death); BAPX1 (Bagpipe homeobox (Drosophila) homolog 1); BARD1 (BRCA1 associated RING domain 1); BARX2 (BarH-like homeobox 2); BAX (BCL2-associated X protein); BDB1 (Brachydactyly type B1); BDC () ; BDE (Brachydactyly type E); BDMR (Brachydactyly-mental retardation syndrome); BDNF (Brain-derived neurotrophic factor); BMP1 (Bone morphogenetic protein 1); BMP2 (Bone morphogenetic protein 2); BMP3 (Bone morphogenetic protein 3 (osteogenic)); BMP4 (Bone morphogenetic protein 4); BMP5 (Bone morphogenetic protein 5); BMP6 (Bone morphogenetic protein 6); BMP7 (Bone morphogenetic protein 7 (osteogenic protein 1)); BMPR1A (Bone morphogenetic protein receptor, type IA); BMPR1B (Bone morphogenetic protein receptor, type IB); BMPR2 (Bone morphogenetic protein receptor, type II (serine/threonine kinase)); CBFA1 (Core-binding factor, runt domain, alpha subunit 1); CBFA2 (Core-binding factor, runt domain, alpha subunit 2 (acute myeloid leukemia 1; aml1 oncogene)); CBFA3 (Core-binding factor, runt domain, alpha subunit 3); CER1 (Cerberus 1 (Xenopus laevis) homolog (cysteine knot superfamily)); CHH (Cartilage-hair hypoplasia); CHRD (Chordin); CHX10 (C elegans ceh-10 homeo domain-containing homolog); CREB2 (CAMP responsive element binding protein 2); CSH2 (Chorionic somatomammotropin hormone 2); DLK1 (Delta (Drosophila)-like 1); EBAF (Endometrial bleeding associated factor (left-right determination, factor A; transforming growth factor beta superfamily)); EDN1 (Endothelin 1); EDN2 (Endothelin 2); EDN3 (Endothelin 3); EDNRA (Endothelin receptor type A); EDNRB (Endothelin receptor type B); EDR2 (Early development regulator 2 (homolog of polyhomeotic 2)); EED (Embryonic ectoderm development protein); EFNA5 (Ephrin-A5); EN1 (Engrailed homolog 1); EN2 (Engrailed homolog 2); ENG (Endoglin (Osler-Rendu-Weber syndrome 1)); EOMES (Eomesodermin (Xenopus laevis) homolog); EPHA2 (EphA2); EPHB2 (EphB2); FAST-1 (Human homolog of Xenopus forkhead activin signal transducer-1); FGD1 (Faciogenital dysplasia (Aarskog-Scott syndrome)); FGF1 (Fibroblast growth factor 1 (acidic)); FGF10 (Fibroblast growth factor 10); FGF13 (Fibroblast growth factor 13); FGF14 (Fibroblast growth factor 14); FGF16 (Fibroblast growth factor 16); FGF2 (Fibroblast growth factor 2 (basic)); FGF3 (Fibroblast growth factor 3 (murine mammary tumor virus integration site (v-int-2) oncogene homolog)); FGF4 (Fibroblast growth factor 4 (heparin secretory transforming protein 1, Kaposi sarcoma oncogene)); FGF7 (Fibroblast growth factor 7 (keratinocyte growth factor)); FGF8 (Fibroblast growth factor 8 (androgen-induced)); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR2 (Fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome, Pfeiffer syndrome, Jackson-Weiss syndrome)); FGFR3 (Fibroblast growth factor receptor 3 (achondroplasia, thanatophoric dwarfism)); FGFR4 (Fibroblast growth factor receptor 4); FKHL16 (Forkhead (Drosophila)-like 16); FKHL7 (Forkhead (Drosophila)-like 7); FRZB (Frizzled-related protein); FZD1 (Frizzled (Drosophila) homolog 1); FZD2 (Frizzled (Drosophila) homolog 2); FZD3 (Frizzled (Drosophila) homolog 3); FZD4 (Frizzled (Drosophila) homolog 4); FZD5 (Frizzled (Drosophila) homolog 5); FZD6 (Frizzled (Drosophila) homolog 6); FZD7 (Frizzled (Drosophila) homolog 7); FZD8 (Frizzled (Drosophila) homolog 8); FZD9 (Frizzled (Drosophila) homolog 9); GDF5 (Growth differentiation factor 5

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(cartilage-derived morphogenetic protein-1)); GLI (Glioma-associated oncogene homolog (zinc finger protein)); GLI2 (GLI-Kruppel family member GLI2); GLI3 (GLI-Kruppel family member GLI3 (Greig cephalopolysyndactyly syndrome)); GLI4 (GLI-Kruppel family member GLI4); GSC (Goosecoid); GSCL (Goosecoid-like); HESX1 (Homeo box gene expressed in ES cells; Rathke pouch homeo box); HLXB9 (Homeo box HB9); HNF3A (Hepatocyte nuclear factor 3, alpha); HNF3B (Hepatocyte nuclear factor 3, beta); HNF3G (Hepatocyte nuclear factor 3, gamma); HNF4A (Hepatocyte nuclear factor 4, alpha); HNF4B (Hepatocyte nuclear factor 4, beta); HNF4G (Hepatocyte nuclear factor 4, gamma); HNF6A (Hepatocyte nuclear factor 6, alpha); HOX11 (Homeo box 11 (T-cell lymphoma 3-associated breakpoint)); HOXA1 (Homeo box A1); HOXA10 (Homeo box A10); HOXA11 (Homeo box A11); HOXA13 (Homeo box A13); HOXA2 (Homeo box A2); HOXA3 (Homeo box A3); HOXA4 (Homeo box A4); HOXA5 (Homeo box A5); HOXA6 (Homeo box A6); HOXA7 (Homeo box A7); HOXA9 (Homeo box A9); HOXA@ (Homeo box A cluster); HOXB1 (Homeo box B1); HOXB2 (Homeo box B2); HOXB3 (Homeo box B3); HOXB4 (Homeo box B4); HOXB5 (Homeo box B5); HOXB6 (Homeo box B6); HOXB7 (Homeo box B7); HOXB8 (Homeo box B8); HOXB9 (Homeo box B9); HOXC10 (Homeo box C10); HOXC11 (Homeo box C11); HOXC12 (Homeo box C12); HOXC13 (Homeo box C13); HOXC4 (Homeo box C4); HOXC5 (Homeo box C5); HOXC6 (Homeo box C6); HOXC8 (Homeo box C8); HOXC9 (Homeo box C9); HOXD1 (Homeo box D1); HOXD10 (Homeo box D10); HOXD11 (Homeo box D11); HOXD12 (Homeo box D12); HOXD13 (Homeo box D13); HOXD3 (Homeo box D3); HOXD4 (Homeo box D4); HOXD8 (Homeo box D8); HOXD9 (Homeo box D9); IHH (Indian hedgehog (Drosophila) homolog); INHBA (Inhibin, beta A (activin A, activin AB alpha polypeptide)); INHBB (Inhibin, beta B (activin AB beta polypeptide)); ISL1 (ISL1 transcription factor, LIM/homeodomain, (islet-1)); JAG1 (Jagged1 (Alagille syndrome)); JAG2 (Jagged 2); LEF1 (Lymphoid enhancer-binding factor 1); LHX1 (LIM homeobox protein 1); LHX2 (LIM HOX gene 2); LHX3 (LIM/homeodomain protein LHX3); LMX1A (LIM homeobox transcription factor 1, alpha); LMX1B (LIM homeobox transcription factor 1, beta); MADH1 (MAD (mothers against decapentaplegic, Drosophila) homolog 1); MADH2 (MAD (mothers against decapentaplegic, Drosophila) homolog 2); MADH3 (MAD (mothers against decapentaplegic, Drosophila) homolog 3); MADH4 (MAD (mothers against decapentaplegic, Drosophila) homolog 4); MADH5 (MAD (mothers against decapentaplegic, Drosophila) homolog 5); MADH6 (MAD (mothers against decapentaplegic, Drosophila) homolog 6); MADH7 (MAD (mothers against decapentaplegic, Drosophila) homolog 7); MADH9 (MAD (mothers against decapentaplegic, Drosophila) homolog 9); MEIS1 (Meis1 (mouse) homolog); MEIS2 (Meis (mouse) homolog 2); MEIS3 (Meis (mouse) homolog 3); MEKK5 (MAP/ERK kinase kinase 5); MLLT1 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 1); MSX1 (Msh (Drosophila) homeo box homolog 1 (formerly homeo box 7)); MSX2 (Msh (Drosophila) homeo box homolog 2); NOG (Noggin); ORW2 (Osler-Rendu-Weber syndrome 2); PAX1 (Paired box gene 1); PAX1 (Paired box gene 1); PAX2 (Paired box gene 2); PAX3 (Paired box gene 3 (Waardenburg syndrome 1)); PAX4 (Paired box gene 4); PAX5 (Paired box gene 5 (B-cell lineage specific activator protein)); PAX6 (Paired box gene 6 (aniridia, keratitis)); PAX7 (Paired box gene 7); PAX8 (Paired box gene 8); PAX9 (Paired box gene 9); PBX1 (Pre-B-cell leukemia transcription factor 1); PBX2 (Pre-B-cell leukemia transcription factor 2); PBX3 (Pre-B-cell leukemia transcription factor 3); PITX2 (Paired-like homeodomain transcription factor 2); PKHD1 (Polycystic kidney and hepatic disease 1 (autosomal recessive)); PRO1 (Prophet of Pit1, paired-like homeodomain transcription factor); PTCH (Patched (Drosophila) homolog); PTCH2 (Patched (Drosophila) homolog 2); RARA (Retinoic acid receptor, alpha); RARB (Retinoic acid receptor, beta); RARG (Retinoic acid receptor, gamma); RET (Ret proto-oncogene (multiple endocrine neoplasia MEN2A, MEN2B and medullary thyroid carcinoma 1, Hirschsprung disease)); RIEG2 (Rieger syndrome 2); RXRA (Retinoid X receptor, alpha); RXRB (Retinoid X receptor, beta); RXRG (Retinoid X receptor, gamma); SFRP1 (Secreted frizzled-related protein 1); SFRP2 (Secreted frizzled-related protein 2); SFRP4 (Secreted frizzled-related protein 4); SFRP5 (Secreted frizzled-related protein 5); SHH (Sonic hedgehog (Drosophila) homolog); SMARCA2 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2); SMARCA4 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 4); SMARCB1 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily b, member 1); SMARCC1 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily c, member 1); SMARCC2 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily c, member 2); SMARCD1 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 1); SMARCD2 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 2); SMARCD3 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 3); SMARCE1 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily e, member 1); SMOH (Smoothed (Drosophila) homolog); SOX1 (SRY (sex determining region Y)-box 1); SOX10 (SRY (sex-determining region Y)-box 10); SOX2 (SRY (sex determining region Y)-box 2); SOX9 (SRY (sex-determining region Y)-box 9 (campomelic dysplasia, autosomal sex-reversal)); SRF (Serum response factor (c-fos serum response element-binding transcription factor)); STAT3 (Signal transducer and activator of transcription 3 (acute-phase response factor)); T (T brachyury (mouse) homolog); TBX1 (T-box 1); TBX10 (T-box 10); TBX10 (T-box 10); TBX15 (T-box 15); TBX18 (T-box 18); TBX19 (T-box 19); TBX2 (T-box 2); TBX3 (T-box 3 (ulnar mammary syndrome)); TBX4 (T-box 4); TBX5 (T-box 5); TBX6 (T-box 6);

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TBX7 (T-box 7); TFAP2A (Transcription factor AP-2 alpha (activating enhancer-binding protein 2 alpha)); TFAP2B (Transcription factor AP-2 beta (activating enhancer-binding protein 2 beta)); TFCOU2P2 (Transcription factor COUP 2 (chicken ovalbumin upstream promoter 2, apolipoprotein regulatory protein)); TGFBR1 (Transforming growth factor, beta receptor I (activin A receptor type II-like kinase, 53kD)); TWIST (Twist (Drosophila) homolog); WNT1 (Wingless-type MMTV integration site family, member 1); WNT10B (Wingless-type MMTV integration site family, member 10B); WNT11 (Wingless-type MMTV integration site family, member 11); WNT14 (Wingless-type MMTV integration site family, member 14); WNT15 (Wingless-type MMTV integration site family, member 15); WNT2 (Wingless-type MMTV integration site family, member 2); WNT2B (Wingless-type MMTV integration site family, member 2B); WNT3 (Wingless-type MMTV integration site family, member 3); WNT5A (Wingless-type MMTV integration site family, member 5A); WNT6 (Wingless-type MMTV integration site family, member 6); WNT7A (Wingless-type MMTV integration site family, member 7A); WNT7B (Wingless-type MMTV integration site family, member 7B); WNT8A (Wingless-type MMTV integration site family, member 8A); WNT8B (Wingless-type MMTV integration site family, member 8B); ZIC3 (Zic family member 3 (odd-paired Drosophila homolog, heterotaxy 1)); and ZIC3 (Zic family member 3 (odd-paired Drosophila homolog, heterotaxy 1)).

DNA adducts

DFFA (DNA fragmentation factor, 45 kD, alpha subunit); DNMT1 (DNA (cytosine-5-)-methyltransferase 1); DNMT2 (DNA (cytosine-5-)-methyltransferase 2); IGHMBP2 (Immunoglobulin mu binding protein 2); LIG1 (Ligase I, DNA, ATP-dependent); LIG3 (Ligase III, DNA, ATP-dependent); LIG4 (Ligase IV, DNA, ATP-dependent); MGMT (O-6-methylguanine-DNA methyltransferase); NTHL1 (Nth (E.coli endonuclease III)-like 1); PRIM1 (Primase, polypeptide 1 (49kD)); RAG1 (Recombination activating gene 1); RFC3 (Replication factor C (activator 1) 3 (38kD)); RFC4 (Replication factor C (activator 1) 4 (37kD)); TERT (Telomerase reverse transcriptase); TOP1 (Topoisomerase (DNA) I); TOP2A (Topoisomerase (DNA) II alpha (170kD)); TOP2B (Topoisomerase (DNA) II beta (180kD)); TOP3 (Topoisomerase (DNA) III); and TOP3B (Topoisomerase (DNA) III beta).

DNA damage

ADPRT (ADP-ribosyltransferase (NAD⁺; poly (ADP-ribose) polymerase)); APEX (APEX nuclease (multifunctional DNA repair enzyme)); ATM (Ataxia telangiectasia mutated (includes complementation groups A, C and D)); BLM (Bloom syndrome); BRCA1 (Breast cancer 1, early onset); BRCA2 (Breast cancer 2, early onset); CKN1 (Cockayne syndrome 1 (classical)); DDB1 (Damage-specific DNA binding protein 1 (127kD)); DDB2 (Damage-specific DNA binding protein 2 (48kD)); DDIT1 (DNA-damage-inducible transcript 1); DDIT1L (DNA-damage-inducible transcript 1-like); DDIT3 (DNA-damage-inducible transcript 3); DFFA (DNA fragmentation factor, 45 kD, alpha subunit); DNMT1 (DNA (cytosine-5-)-methyltransferase 1); DNMT2 (DNA (cytosine-5-)-methyltransferase 2); ERCC1 (Excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)); ERCC2 (Excision repair cross-complementing rodent repair deficiency, complementation group 2 (xeroderma pigmentosum D)); ERCC3 (Excision repair cross-complementing rodent repair deficiency, complementation group 3 (xeroderma pigmentosum group B complementing)); ERCC5 (Excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))); ERCC6 (Excision repair cross-complementing rodent repair deficiency, complementation group 6); FANCA (Fanconi anemia, complementation group A); FANCB (Fanconi anemia, complementation group B); FANCC (Fanconi anemia, complementation group C); FANCG (Fanconi anemia, complementation group G); G22P1 (Thyroid autoantigen 70kD (Ku antigen)); GTBP (G/T mismatch-binding protein); IGHMBP2 (Immunoglobulin mu binding protein 2); INPPL1 (Inositol polyphosphate phosphatase-like 1); LIG1 (Ligase I, DNA, ATP-dependent); LIG3 (Ligase III, DNA, ATP-dependent); LIG3 (Ligase III, DNA, ATP-dependent); LIG4 (Ligase IV, DNA, ATP-dependent); MGMT (O-6-methylguanine-DNA methyltransferase); MLH1 (MutL (E. coli) homolog 1 (colon cancer, nonpolyposis type 2)); MPG (N-methylpurine-DNA glycosylase); MSH2 (MutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)); MSH3 (MutS (E. coli) homolog 3); MSH4 (MutS (E. coli) homolog 4); MSH5 (MutS (E. coli) homolog 5); MTH1 (MutT (E. coli) human homolog (8-oxo-7,8-dihydroguanosine triphosphatase)); NTHL1 (Nth (E.coli endonuclease III)-like 1); PMS1 (Postmeiotic segregation increased (S. cerevisiae) 1); PMS2 (Postmeiotic segregation increased (S. cerevisiae) 2); PMS2L1 (Postmeiotic segregation increased 2-like 1); PMS2L11 (Postmeiotic segregation increased 2-like 11); PMS2L12 (Postmeiotic segregation increased 2-like 12); PMS2L2 (Postmeiotic segregation increased 2-like 2); PMS2L3 (Postmeiotic segregation increased 2-like 3); PMS2L4 (Postmeiotic segregation increased 2-like 4); PMS2L5 (Postmeiotic segregation increased 2-like 5); PMS2L6 (Postmeiotic segregation increased 2-like 6); PMS2L8 (Postmeiotic segregation increased 2-like 8); PMS2L9 (Postmeiotic segregation increased 2-like 9); POLB (Polymerase (DNA directed), beta); PRIM1 (Primase, polypeptide 1 (49kD)); PRKDC (Protein kinase, DNA-activated, catalytic polypeptide); RAD1 (RAD1 (S. pombe) homolog); RAD17 (RAD17 (S. pombe) homolog); RAD21 (RAD21 (S. pombe) homolog); RAD23A (RAD23 (S. cerevisiae) homolog A); RAD23B (RAD23 (S. cerevisiae) homolog B); RAD51 (RAD51 (S. cerevisiae) homolog (E coli RecA homolog)); RAD51C (RAD51

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(*S. cerevisiae*) homolog C); RAD51L1 (RAD51 (*S. cerevisiae*)-like 1); RAD51L3 (RAD51 (*S. cerevisiae*)-like 3); RAD52 (RAD52 (*S. cerevisiae*) homolog); RAD54L (RAD54 (*S. cerevisiae*)-like); RAG1 (Recombination activating gene 1); RFC3 (Replication factor C (activator 1) 3 (38kD)); RFC4 (Replication factor C (activator 1) 4 (37kD)); TDG (Thymine-DNA glycosylase); TERT (Telomerase reverse transcriptase); TOP1 (Topoisomerase (DNA) I); TOP2A (Topoisomerase (DNA) II alpha (170kD)); TOP2B (Topoisomerase (DNA) II beta (180kD)); TOP3 (Topoisomerase (DNA) III); TOP3B (Topoisomerase (DNA) III beta); TP53 (Tumor protein p53 (Li-Fraumeni syndrome)); TRLP1 (tRNA leucine (AAG) pseudogene 1); UNG (Uracil-DNA glycosylase); WRN (Werner syndrome); XPA (Xeroderma pigmentosum, complementation group A); XPC (Xeroderma pigmentosum, complementation group C); XRCC1 (X-ray repair complementing defective repair in Chinese hamster cells 1); XRCC2 (X-ray repair complementing defective repair in Chinese hamster cells 2); XRCC3 (X-ray repair complementing defective repair in Chinese hamster cells 3); XRCC4 (X-ray repair complementing defective repair in Chinese hamster cells 4); XRCC5 (X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining; Ku autoantigen, 80kD)); and XRCC8 (X-ray repair complementing defective repair in Chinese hamster cells 8).

DNA replication

ADAR (Adenosine deaminase, RNA-specific); ADPRT (ADP-ribosyltransferase (NAD⁺; poly (ADP-ribose) polymerase)); ATM (Ataxia telangiectasia mutated (includes complementation groups A, C and D)); ATR (Ataxia telangiectasia and Rad3 related); ATRX (Alpha thalassemia/mental retardation syndrome X-linked); BLM (Bloom syndrome); CENPB (Centromere protein B (80kD)); CENPC1 (Centromere protein C 1); CHD4 (Chromodomain helicase DNA binding protein 4); CHDL (Chromodomain-helicase-DNA-binding protein); CKN1 (Cockayne syndrome 1 (classical)); DNA2L (DNA2 (DNA replication helicase, yeast, homolog)-like); DNASE1 (Deoxyribonuclease I); DNASE1L1 (Deoxyribonuclease I-like 1); DNASE1L2 (Deoxyribonuclease I-like 2); ERCC1 (Excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)); ERCC2 (Excision repair cross-complementing rodent repair deficiency, complementation group 2 (xeroderma pigmentosum D)); ERCC3 (Excision repair cross-complementing rodent repair deficiency, complementation group 3 (xeroderma pigmentosum group B complementing)); ERCC4 (Excision repair cross-complementing rodent repair deficiency, complementation group 4); ERCC5 (Excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))); ERCC6 (Excision repair cross-complementing rodent repair deficiency, complementation group 6); EXO1 (Exonuclease 1); FEN1 (Flap structure-specific endonuclease 1); G22P1 (Thyroid autoantigen 70kD (Ku antigen)); HMG1Y (High-mobility group (nonhistone chromosomal) protein isoforms I and Y); HUS1 (HUS1 (*S. pombe*) checkpoint homolog); LIG2 (Ligase II, DNA, ATP-dependent); MLH1 (MutL (*E. coli*) homolog 1 (colon cancer, nonpolyposis type 2)); MSH5 (MutS (*E. coli*) homolog 5); POLA (Polymerase (DNA directed), alpha); POLB (Polymerase (DNA directed), beta); POLD1 (Polymerase (DNA directed), delta 1, catalytic subunit (125kD)); RAD1 (RAD1 (*S. pombe*) homolog); RAD50 (RAD50 (*S. cerevisiae*) homolog); RAD51 (RAD51 (*S. cerevisiae*) homolog (*E. coli* RecA homolog)); RAD51C (RAD51 (*S. cerevisiae*) homolog C); RAD52 (RAD52 (*S. cerevisiae*) homolog); RPA1 (Replication protein A1 (70kD)); RPA2 (Replication protein A2 (32kD)); RPA3 (Replication protein A3 (14kD)); RPA40 (RNA polymerase I subunit); SNRPA (Small nuclear ribonucleoprotein polypeptide A); SNRPA1 (Small nuclear ribonucleoprotein polypeptide A); TOP1 (Topoisomerase (DNA) I); TOP2A (Topoisomerase (DNA) II alpha (170kD)); TOP3 (Topoisomerase (DNA) III); TOP3B (Topoisomerase (DNA) III beta); TR4 (TR4 nuclear hormone receptor); WRN (Werner syndrome); XPA (Xeroderma pigmentosum, complementation group A); XRCC1 (X-ray repair complementing defective repair in Chinese hamster cells 1); XRCC2 (X-ray repair complementing defective repair in Chinese hamster cells 2); XRCC3 (X-ray repair complementing defective repair in Chinese hamster cells 3); XRCC4 (X-ray repair complementing defective repair in Chinese hamster cells 4); and XRCC5 (X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining; Ku autoantigen, 80kD)).

Gene regulation

ADA (Adenosine deaminase); ADPRT (ADP-ribosyltransferase (NAD⁺; poly (ADP-ribose) polymerase)); ADSS (Adenylosuccinate synthase); AHR (Aryl hydrocarbon receptor); ATBF1 (AT-binding transcription factor 1); ATF3 (Activating transcription factor 3); BARD1 (BRCA1 associated RING domain 1); CBF2 (CCAAT-box-binding transcription factor); CBFA2 (Core-binding factor, runt domain, alpha subunit 2 (acute myeloid leukemia 1; *aml1* oncogene)); CBFA3 (Core-binding factor, runt domain, alpha subunit 3); CBF2 (Core-binding factor, beta subunit); CEBPA (CCAAT/enhancer binding protein (C/EBP), alpha); CEBPB (CCAAT/enhancer binding protein (C/EBP), beta); CEBPD (CCAAT/enhancer binding protein (C/EBP), delta); CEBPE (CCAAT/enhancer binding protein (C/EBP), epsilon); CEBPG (CCAAT/enhancer binding protein (C/EBP), gamma); CENPE (Centromere protein E (312kD)); CHD1 (Chromodomain helicase DNA binding protein 1); CHD2 (Chromodomain helicase DNA binding protein 2); CHD3 (Chromodomain helicase DNA binding protein 3); CHDL (Chromodomain-helicase-DNA-binding protein); CREB2 (cAMP responsive element binding protein 2); CREBBP (CREB binding protein (Rubinstein-Taybi syndrome)); CSE1L (Chromosome segregation 1 (yeast

homolog)-like); CSTF3 (Cleaveage stimulation factor, 3' pre-RNA, subunit 3, 77kD); CTPS (CTP synthase); DCK (Deoxycytidine kinase); DCTD (DCMP deaminase); DGUOK (Deoxyguanosine kinase); DNASE1 (Deoxyribonuclease I); DNASE1L3 (Deoxyribonuclease I-like 3); DUT (DUTP pyrophosphatase); DXS423E (Segregation of mitotic chromosomes 1 (SMC1, yeast human homolog of); E2F2 (E2F transcription factor 2); E2F5 (E2F transcription factor 5, p130-binding); EEF1A1 (Eukaryotic translation elongation factor 1 alpha 1); EEF2 (Eukaryotic translation elongation factor 2); EGR1 (Early growth response 1); EIF2B1 (Eukaryotic translation initiation factor 2B, subunit 1 (alpha, 26kD)); EIF3S6 (Eukaryotic translation initiation factor 3, subunit 6 (48kD)); EIF4E (Eukaryotic translation initiation factor 4E); EIF4G2 (Eukaryotic translation initiation factor 4 gamma, 2); ELF1 (E74-like factor 1 (ets domain transcription factor)); ELF3 (E74-like factor 3 (ets domain transcription factor)); ELK4 (ELK4, ETS-domain protein (SRF accessory protein 1) NOTE: Symbol and name provisional); EP300 (E1A binding protein p300); ESR1 (Estrogen receptor 1); ETV3 (Ets variant gene 3); ETV4 (Ets variant gene 4 (E1A enhancer-binding protein, E1AF)); ETV5 (Ets variant gene 5 (ets-related molecule)); FKHR (Forkhead (Drosophila) homolog 1 (rhabdomyosarcoma)); FLI1 (Friend leukemia virus integration 1); GART (Phosphoribosylglycinamide formyltransferase, phosphoribosylglycinamide synthetase, phosphoribosylaminoimidazole synthetase); GATA1 (GATA-binding protein 1 (globin transcription factor 1)); GATA2 (GATA-binding protein 2); GATA3 (GATA-binding protein 3); GATA4 (GATA-binding protein 4); GLI (Glioma-associated oncogene homolog (zinc finger protein)); GRSF1 (G-rich RNA sequence binding factor 1); H4FI (H4 histone family, member 1); HIF1A (Hypoxia-inducible factor 1, alpha subunit (basic helix-loop-helix transcription factor)); HIVEP1 (Human immunodeficiency virus type I enhancer-binding protein 1); HLF (Hepatic leukemia factor); HMG17 (High-mobility group (nonhistone chromosomal) protein 17); HMG2 (High-mobility group (nonhistone chromosomal) protein 2); HNRPK (Heterogeneous nuclear ribonucleoprotein K); ICSBP1 (Interferon consensus sequence binding protein 1); ID1 (Inhibitor of DNA binding 1, dominant negative helix-loop-helix protein); ID2 (Inhibitor of DNA binding 2, dominant negative helix-loop-helix protein); ID3 (Inhibitor of DNA binding 3, dominant negative helix-loop-helix protein); ID4 (Inhibitor of DNA binding 4, dominant negative helix-loop-helix protein); IRF1 (Interferon regulatory factor 1); IRF2 (Interferon regulatory factor 2); IRF4 (Interferon regulatory factor 4); IRF5 (Interferon regulatory factor 5); IRF7 (Interferon regulatory factor 7); JUN (V-jun avian sarcoma virus 17 oncogene homolog); JUND (Jun D proto-oncogene); LAF4 (Lymphoid nuclear protein related to AF4); LYL1 (Lymphoblastic leukemia derived sequence 1); MAFG (V-maf musculoaponeurotic fibrosarcoma (avian) oncogene family, protein G); MAX (MAX protein); MDM2 (Mouse double minute 2, human homolog of; p53-binding protein); MHC2TA (MHC class II transactivator); MKI67 (Antigen identified by monoclonal antibody Ki-67); MNDA (Myeloid cell nuclear differentiation antigen); MSX1 (Msh (Drosophila) homeo box homolog 1 (formerly homeo box 7)); MTHFD (5,10-methylenetetrahydrofolate dehydrogenase, 5,10-methylenetetrahydrofolate cyclohydrolase, 10-formyltetrahydrofolate synthetase); MYC (V-myc avian myelocytomatosis viral oncogene homolog); NCBP (Nuclear cap binding protein, 80kD); NCBP (Nuclear cap binding protein, 80kD); NDP52 (Nuclear domain 10 protein); NFE2 (Nuclear factor (erythroid-derived 2), 45kD); NFKB1 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)); NFKB2 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)); NFYA (Nuclear transcription factor Y, alpha); NP (Nucleoside phosphorylase); NUMA1 (Nuclear mitotic apparatus protein 1); ODC1 (Ornithine decarboxylase 1); PAX3 (Paired box gene 3 (Waardenburg syndrome 1)); PBX1 (Pre-B-cell leukemia transcription factor 1); PBX3 (Pre-B-cell leukemia transcription factor 3); PCNA (Proliferating cell nuclear antigen); PEX6 (Peroxisomal biogenesis factor 6); PML (Promyelocytic leukemia); POU2AF1 (POU domain, class 2, associating factor 1); POU2F1 (POU domain, class 2, transcription factor 1); POU2F2 (POU domain, class 2, transcription factor 2); PPAT (Phosphoribosyl pyrophosphate amidotransferase); PRPS1 (Phosphoribosyl pyrophosphate synthetase 1); PTB (Polypyrimidine tract binding protein (heterogeneous nuclear ribonucleoprotein I)); RANBP2 (RAN binding protein 2); RARB (Retinoic acid receptor, beta); RARG (Retinoic acid receptor, gamma); RECQL (RecQ protein-like (DNA helicase Q1-like)); RENBP (Renin-binding protein); RPL27 (Ribosomal protein L27); RPL32 (Ribosomal protein L32); RPL5 (Ribosomal protein L5); RPS16 (Ribosomal protein S16); RPS21 (Ribosomal protein S21); RPS5 (Ribosomal protein S5); RPS9 (Ribosomal protein S9); RXRA (Retinoid X receptor, alpha); SATB1 (Special AT-rich sequence binding protein 1 (binds to nuclear matrix/scaffold-associating DNA's)); SFRS7 (Splicing factor, arginine/serine-rich 7 (35kD)); SKIL (SKI-like); SMARCA2 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2); SOX4 (SRY (sex determining region Y)-box 4); SP100 (Nuclear antigen Sp100); SPIB (Spi-B transcription factor (Spi-1/PU.1 related)); SRF (Serum response factor (c-fos serum response element-binding transcription factor)); STAT3 (Signal transducer and activator of transcription 3 (acute-phase response factor)); STAT4 (Signal transducer and activator of transcription 4); STAT5A (Signal transducer and activator of transcription 5A); TAF2C2 (TATA box binding protein (TBP)-associated factor, RNA polymerase II, C2, 105kD); TAL2 (T-cell acute lymphocytic leukemia 2); TCEB1L (Transcription elongation factor B (SIH), polypeptide 1-like); TCF12 (Transcription factor 12 (HTF4, helix-loop-helix transcription factors 4)); TCF3 (Transcription factor 3 (E2A immunoglobulin enhancer binding factors E12/E47)); TCF7 (Transcription factor 7 (T-cell specific, HMG-box)); TFAP2B (Transcription factor AP-2 beta (activating enhancer-binding protein 2 beta)); TFAP4 (Transcription factor AP-4 (activating enhancer-binding protein 4)); TFDP2 (Transcription factor Dp-2 (E2F dimerization partner 2)); THRA (Thyroid hormone

receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog)); TIAL1 (TIA1 cytotoxic granule-associated RNA-binding protein-like 1); TK1 (Thymidine kinase 1, soluble); TOP1 (Topoisomerase (DNA) I); TOP2B (Topoisomerase (DNA) II beta (180kD)); TP53 (Tumor protein p53 (Li-Fraumeni syndrome)); UBL1 (Ubiquitin-like 1 (sentrin)); WT1 (Wilms tumor 1); XPO1 (Exportin 1 (CRM1, yeast, homolog)); ZFP36 (Zinc finger protein homologous to Zfp-36 in mouse); ZNF173 (Zinc finger protein 173); ZNF200 (Zinc finger protein 200); ZNF42 (Zinc finger protein 42 (myeloid-specific retinoic acid- responsive));

Immunology

A1BG (Alpha-1-B glycoprotein); A2M (Alpha-2-macroglobulin); AAA (Achalasia-addisonianism-alacrimia syndrome (Allgrove syndrome); AABT (Beta-amino acids, renal transport of); AACT (Alpha-1-antichymotrypsin); AARS (Alanyl-tRNA synthetase); ABAT (4-aminobutyrate aminotransferase); ABC7 (ATP-binding cassette 7); ABO (ABO blood group (transferase A, alpha); 1-3-N-acetylgalactosaminyltransferase; transferase B, alpha 1-3-galactosyltransferase); ACADL (Acyl-Coenzyme A dehydrogenase, long chain); ACADM (Acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain); ACADS (Acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain); ACAT2 (Acetyl-Coenzyme A acetyltransferase 2 (acetoacetyl Coenzyme A thiolase)); ACHE (Acetylcholinesterase (YT blood group)); ACLS (Acrocallosal syndrome); ACO1 (Aconitase 1, soluble); ACO2 (Aconitase 2, mitochondrial); ACP1 (Acid phosphatase 1, soluble); ACP5 (Acid phosphatase 5, tartrate resistant); ACTC (Actin, alpha, cardiac muscle); ACTG2 (Actin, gamma 2, smooth muscle, enteric); ACTN2 (Actinin, alpha 2); ACUG (Arthrocuteaneous granulomatosis (Blau syndrome)); ACY1 (Aminoacylase 1); ADA (Adenosine deaminase); ADAM10 (A disintegrin and metalloprotease domain 10); ADAM8 (A disintegrin and metalloprotease domain 8); ADCYAP1 (Adenylate cyclase activating polypeptide 1 (pituitary)); ADD1 (Adducin 1 (alpha)); ADH1 (Alcohol dehydrogenase 1 (class I), alpha polypeptide); ADH2 (Alcohol dehydrogenase 2 (class I), beta polypeptide); ADH3 (Alcohol dehydrogenase 3 (class I), gamma polypeptide); ADH4 (Alcohol dehydrogenase 4 (class II), pi polypeptide); ADH5 (Alcohol dehydrogenase 5 (class III), chi polypeptide); ADH5 (Alcohol dehydrogenase 5 (class III), chi polypeptide); ADK (Adenosine kinase); ADORA1 (Adenosine A1 receptor); ADORA2A (Adenosine A2a receptor); ADORA2A (Adenosine A2a receptor); ADPRT (ADP-ribosyltransferase (NAD⁺; poly (ADP-ribose) polymerase)); ADRA2A (Adrenergic, alpha-2A-, receptor); ADRA2B (Adrenergic, alpha-2B-, receptor); ADRA2C (Adrenergic, alpha-2C-, receptor); ADRB1 (Adrenergic, beta-1-, receptor); ADRB2 (Adrenergic, beta-2-, receptor, surface); ADRB3 (Adrenergic, beta-3-, receptor); ADSS (Adenylosuccinate synthase); AFP (Alpha-fetoprotein); AGA (Aspartylglucosaminidase); AGMX2 (Agammaglobulinemia, X-linked 2 (with growth hormone deficiency)); AGT (Angiotensinogen); AGTR1 (Angiotensin receptor 1); AGTR2 (Angiotensin receptor 2); AGXT (Alanine-glyoxylate aminotransferase (oxalosis I; hyperoxaluria I; glycolicaciduria; serine-pyruvate aminotransferase)); AHCY (S-adenosylhomocysteine hydrolase); AHR (Aryl hydrocarbon receptor); AHSG (Alpha-2-HS-glycoprotein); AIH2 (Amelogenesis imperfecta 2, hypocalcification (autosomal dominant)); AIRE (Autoimmune regulator (automimmune) polyendocrinopathy candidiasis ectodermal dystrophy)); AK1 (Adenylate kinase 1); AKT1 (V-akt murine thymoma viral oncogene homolog 1); ALAD (Aminolevulinate, delta-, dehydratase); ALAS2 (Aminolevulinate, delta-, synthase 2) (sideroblastic/hypochromic anemia)); ALB (Albumin); ALD (Adrenoleukodystrophy/adrenomyeloneuropathy); ALDH1 (Aldehyde dehydrogenase 1, soluble); ALDH2 (Aldehyde dehydrogenase 2, mitochondrial); ALDH6 (Aldehyde dehydrogenase 6); ALDH9 (Aldehyde dehydrogenase 9 (gamma-aminobutyraldehyde dehydrogenase, E3 isozyme)); ALDOA (Aldolase A, fructose-bisphosphate); ALDOB (Aldolase B, fructose-bisphosphate); ALOX12 (Arachidonate 12-lipoxygenase); ALOX5 (Arachidonate 5-lipoxygenase); ALPL (Alkaline phosphatase, liver/bone/kidney); ALPP (Alkaline phosphatase, placental (Regan isozyme)); ALPPL2 (Alkaline phosphatase, placental-like 2); AMBP (Alpha-1-microglobulin/bikunin precursor); AMCN (Arthrogryposis multiplex congenita, neurogenic); AMELX (Amelogenin (X chromosome, amelogenesis imperfecta 1)); AMH (Anti-Mullerian hormone); AMPH (Amphiphysin (Stiff-Mann syndrome with breast cancer 128kD autoantigen)); AMPHL (Amphiphysin-like); AMY1A (Amylase, alpha 1A; salivary); AMY2A (Amylase, alpha 2A; pancreatic); ANK1 (Ankyrin 1, erythrocytic); ANPEP (Alanyl (membrane) aminopeptidase (aminopeptidase N, aminopeptidase M, microsomal aminopeptidase, CD13, p150)); ANX11 (Annexin XI (56kD autoantigen)); ANX3 (Annexin III (lipocortin III, 1,2-cyclic-inositol-phosphate phosphodiesterase, placental anticoagulant protein III, calcimedin 35-alpha)); ANX4 (Annexin IV (placental anticoagulant protein II)); ANX5 (Annexin V (endonexin II)); ANX8 (Annexin VIII); APAF1 (Apoptotic protease activating factor); APBA2 (Amyloid beta (A4) precursor protein-binding, family A, member 2 (X11-like)); APBB1 (Amyloid beta (A4) precursor protein-binding, family B, member 1 (Fe65)); APC (Adenomatosis polyposis coli); APCS (Amyloid P component, serum); APEH (N-acylaminoacyl-peptide hydrolase); API1 (Apoptosis inhibitor 1); API2 (Apoptosis inhibitor 2); API3 (Apoptosis inhibitor 3); API4 (Apoptosis inhibitor 4 (survivin)); APOA1 (Apolipoprotein A-I); APOA2 (Apolipoprotein A-II); APOA4 (Apolipoprotein A-IV); APOB (Apolipoprotein B (including Ag(x) antigen)); APOC2 (Apolipoprotein C-II); APOC3 (Apolipoprotein C-III); APOD (Apolipoprotein D); APOE (Apolipoprotein E); APOH (Apolipoprotein H (beta-2-glycoprotein I)); APP (Amyloid beta (A4) precursor protein (protease nexin-II, Alzheimer disease)); APRT (Adenine phosphoribosyltransferase); AQP1 (Aquaporin 1 (channel-forming integral protein, 28kD)); AQP2 (Aquaporin 2 (collecting duct)); AR (Androgen receptor (dihydrotestosterone receptor; testicular

feminization; spinal and bulbar muscular atrophy; Kennedy disease)); AREG (Amphiregulin (schwannoma-derived growth factor)); ARHE (Ras homolog gene family, member E); ARHGAP1 (Rho GTPase activating protein 1); ARHGAP5 (Rho GTPase activating protein 5); ARNT (Aryl hydrocarbon receptor nuclear translocator); ARNTL (Aryl hydrocarbon receptor nuclear translocator-like); ARSA (Arylsulfatase A); ART1 (ADP-ribosyltransferase 1); ARVD2 (Arrhythmogenic right ventricular dysplasia 2); ASL (Argininosuccinate lyase); ASNS (Asparagine synthetase); ASPH (Aspartate beta-hydroxylase); AT3 (Antithrombin III); ATCAY (Ataxia, cerebellar, Cayman type); ATM (Ataxia telangiectasia mutated (includes complementation) groups A, C and D)); ATOX1 (ATX1 (antioxidant protein 1, yeast) homolog 1); ATP1A1 (ATPase, Na⁺/K⁺ transporting, alpha 1 polypeptide); ATP2B2 (ATPase, Ca⁺⁺ transporting, plasma membrane 2); ATP4B (ATPase, H⁺/K⁺ exchanging, beta polypeptide); ATP7B (ATPase, Cu⁺⁺ transporting, beta polypeptide (Wilson disease)); ATR (Ataxia telangiectasia and Rad3 related); ATRN (Attractin (with dipeptidylpeptidase IV activity)); ATRX (Alpha thalassemia/mental retardation syndrome X-linked); ATSV (Axonal transport of synaptic vesicles); AUH (AU RNA-binding protein/enoyl-Coenzyme A hydratase); AVP (Arginine vasopressin (neurophysin II, antidiuretic hormone, diabetes insipidus, neurohypophyseal)); AVPR1A (Arginine vasopressin receptor 1A); AVPR2 (Arginine vasopressin receptor 2 (nephrogenic diabetes insipidus)); AXL (AXL receptor tyrosine kinase); AZGP1 (Alpha-2-glycoprotein 1, zinc); AZU1 (Azurocidin 1 (cationic antimicrobial protein 37)); B120 (Brain protein 120); B2M (Beta-2-microglobulin); BAG1 (BCL2-associated athanogene); BAK1 (BCL2-antagonist/killer 1); BAX (BCL2-associated X protein); BCHE (Butyrylcholinesterase); BCKDHA (Branched chain keto acid dehydrogenase E1, alpha polypeptide (maple syrup urine disease)); BCL1 (B-cell CLL/lymphoma 1); BCL2 (B-cell CLL/lymphoma 2); BCL2A1 (BCL2-related protein A1); BCL2L1; BCL2L2 (BCL2-like 2); BCL7 (B-cell CLL/lymphoma 7); BCPM (Benign chronic pemphigus (Hailey-Hailey disease)); BCPR (Breast cancer-related regulator of TP53); BCR (Breakpoint cluster region); BDKRB1 (Bradykinin receptor B1); BDKRB2 (Bradykinin receptor B2); BENE (BENE protein); BF (B-factor, properdin); BGLAP (Bone gamma-carboxyglutamate (gla) protein (osteocalcin)); BGP (Biliary glycoprotein); BHR1 (Bronchial hyperresponsiveness-1 (bronchial asthma)); BID (BH3 interacting domain death agonist); BLK (B lymphoid tyrosine kinase); BLM (Bloom syndrome); BLMH (Bleomycin hydrolase); BMI1 (Murine leukemia viral (bmi-1) oncogene homolog); BN51T (BN51 (BHK21) temperature sensitivity complementing); BPAG1 (Bullous pemphigoid antigen 1 (230/240kD)); BPI (Bactericidal/permeability-increasing protein); BRAF (V-raf murine sarcoma viral oncogene homolog B1); BRAK (CXC chemokine in breast and kidney); BRCA1 (Breast cancer 1, early onset); BRCA2 (Breast cancer 2, early onset); BSEP (Bile salt export pump (ABC member 16, MDR/TAP subfamily)); BST1 (Bone marrow stromal cell antigen 1); BTD (Biotinidase); BTK (Bruton agammaglobulinemia tyrosine kinase); BUB1 (Budding uninhibited by benzimidazoles 1 (yeast homolog)); C1NH (Complement component 1 inhibitor (angioedema, hereditary)); C1QA (Complement component 1, q subcomponent, alpha polypeptide); C1QB (Complement component 1, q subcomponent, beta Polypeptide); C1QBP (Complement component 1, q subcomponent binding protein); C1QG (Complement component 1, q subcomponent, gamma polypeptide); C1R (Complement component 1, r subcomponent); C1S (Complement component 1, s subcomponent); C2 (Complement component 2); C3 (Complement component 3); C3AR1 (Complement component 3a receptor 1); C4A (Complement component 4A); C4B (Complement component 4B); C4BPA (Complement component 4-binding protein, alpha); C4BPAL2 (Complement component 4-binding protein, alpha-like 2); C4BPB (Complement component 4-binding protein, beta); C5 (Complement component 5); C5R1 (Complement component 5 receptor 1 (C5a ligand)); C6 (Complement component 6); C7 (Complement component 7); C8A (Complement component 8, alpha polypeptide); C8B (Complement component 8, beta polypeptide); C8G (Complement component 8, gamma polypeptide); C9 (Complement component 9); CA1 (Carbonic anhydrase I); CA2 (Carbonic anhydrase II); CACNA1S (Calcium channel, voltage-dependent, L type, alpha 1S subunit); CACNB2 (Calcium channel, voltage-dependent, beta 2 subunit); CALCA (Calcitonin/calcitonin-related polypeptide, alpha); CALCR (Calcitonin receptor); CAMP (Cathelicidin antimicrobial peptide); CAPG (Capping protein (actin filament), gelsolin-like); CAPN3 (Calpain, large polypeptide L3); CASP1 (Caspase 1, apoptosis-related cysteine protease (interleukin 1, beta, convertase)); CASP10 (Caspase 10, apoptosis-related cysteine protease); CASP2 (Caspase 2, apoptosis-related cysteine protease (neural precursor cell expressed, developmentally down-regulated 2)); CASP3 (Caspase 3, apoptosis-related cysteine protease); CASP4 (Caspase 4, apoptosis-related cysteine protease); CASP5 (Caspase 5, apoptosis-related cysteine protease); CASP6 (Caspase 6, apoptosis-related cysteine protease); CASP7 (Caspase 7, apoptosis-related cysteine protease); CASP8 (Caspase 8, apoptosis-related cysteine protease); CASP9 (Caspase 9, apoptosis-related cysteine protease); CASR (Calcium-sensing receptor (hypocalciuric hypercalcemia 1, severe neonatal hyperparathyroidism)); CAT (Catalase); CAV3 (Caveolin 3); CBBM (Blue-monochromatic colorblindness (blue cone monochromacy)); CBFA2 (Core-binding factor, runt domain, alpha subunit 2 (acute myeloid leukemia 1; aml1 oncogene)); CBFA2T1 (Core-binding factor, runt domain, alpha subunit 2; translocated to, 1; cyclin D-related); CBFA2T2 (Core-binding factor, runt domain, alpha subunit 2; translocated to, 2); CBFA2T3 (Core-binding factor, runt domain, alpha subunit 2; translocated to, 3); CBFB (Core-binding factor, beta subunit); CBLN1 (Cerebellin 1 precursor); CBR1 (Carbonyl reductase 1); CBS (Cystathionine-beta-synthase); CBX4 (Chromobox homolog 4 (Drosophila Pc class)); CCAL1 (Chondrocalcinosis 1 (calcium pyrophosphate-deposition disease, early onset osteoarthritis)); CCR1 (Chemokine (C-C motif) receptor 1);

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CCR1 (Chemokine (C-C motif) receptor 1); CCR2 (Chemokine (C-C motif) receptor 2); CCR3 (Chemokine (C-C motif) receptor 3); CCR3 (Chemokine (C-C motif) receptor 3); CCR4 (Chemokine (C-C motif) receptor 4); CCR5 (Chemokine (C-C motif) receptor 5); CCR5 (Chemokine (C-C motif) receptor 5); CCR6 (Chemokine (C-C motif) receptor 6); CCR7 (Chemokine (C-C motif) receptor 7); CCR7 (Chemokine (C-C motif) receptor 7); CCR8 (Chemokine (C-C motif) receptor 8); CD14 (CD14 antigen); CD151 (CD151 antigen); CD19 (CD19 antigen); CD1A (CD1A antigen, a polypeptide); CD1B (CD1B antigen, b polypeptide); CD2 (CD2 antigen (p50), sheep red blood cell receptor); CD20 (CD20 antigen); CD22 (CD22 antigen); CD36 (CD36 antigen (collagen type I receptor, thrombospondin receptor)); CD36L1 (CD36 antigen (collagen type I receptor, thrombospondin receptor)-like 1); CD39 (CD39 antigen); CD3E (CD3E antigen, epsilon polypeptide (TiT3 complex)); CD3G (CD3G antigen, gamma polypeptide (TiT3 complex)); CD3Z (CD3Z antigen, zeta polypeptide (TiT3 complex)); CD4 (CD4 antigen (p55)); CD44 (CD44 antigen (homing function and Indian blood group system)); CD47 (CD47 antigen (Rh-related antigen, integrin-associated signal transducer)); CD5 (CD5 antigen (p56-62)); CD53 (CD53 antigen); CD58 (CD58 antigen, (lymphocyte function-associated antigen 3)); CD59 (CD59 antigen p18-20 (antigen identified by monoclonal antibodies 16.3A5, EJ16, EJ30, EL32 and G344)); CD5L (CD5 antigen-like (scavenger receptor cysteine rich family)); CD6 (CD6 antigen); CD63 (CD63 antigen (melanoma 1 antigen)); CD68 (CD68 antigen); CD69 (CD69 antigen (p60, early T-cell activation antigen)); CD7 (CD7 antigen (p41)); CD74 (CD74 antigen (invariant polypeptide of major histocompatibility complex, class II antigen-associated)); CD79A (CD79A antigen (immunoglobulin-associated alpha)); CD79B (CD79B antigen (immunoglobulin-associated beta)); CD80 (CD80 antigen (CD28 antigen ligand 1, B7-1 antigen)); CD81 (CD81 antigen (target of antiproliferative antibody 1)); CD86 (CD86 antigen (CD28 antigen ligand 2, B7-2 antigen)); CD8A (CD8 antigen, alpha polypeptide (p32)); CDA (Cytidine deaminase); CDAN1 (Congenital dyserythropoietic anemia, type I); CDAN2 (Congenital dyserythropoietic anemia, type II); CDC2L1 (Cell division cycle 2-like 1 (PITSLRE proteins)); CDH12 (Cadherin 12 (N-cadherin 2)); CDK2 (Cyclin-dependent kinase 2); CDK4 (Cyclin-dependent kinase 4); CDKN1A (Cyclin-dependent kinase inhibitor 1A (p21, Cip1)); CDKN1B (Cyclin-dependent kinase inhibitor 1B (p27, Kip1)); CDKN1C (Cyclin-dependent kinase inhibitor 1C (p57, Kip2)); CDKN2A (Cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)); CDKN2C (Cyclin-dependent kinase inhibitor 2C (p18, inhibits CDK4)); CDR1 (Cerebellar degeneration-related protein (34kD)); CDR2 (Cerebellar degeneration-related protein (62kD)); CDSN (Corneodesmosin); CDW52 (CDW52 antigen (CAMPATH-1 antigen)); CEBPB (CCAAT/enhancer binding protein (C/EBP), beta); CEBPE (CCAAT/enhancer binding protein (C/EBP), epsilon); CEL (Carboxyl ester lipase (bile salt-stimulated lipase)); CELL (Carboxyl ester lipase-like (bile salt-stimulated lipase-like)); CENPB (Centromere protein B (80kD)); CENPC1 (Centromere protein C 1); CES1 (Carboxylesterase 1 (monocyte/macrophage serine esterase 1)); CETP (Cholesteryl ester transfer protein, plasma); CFTR (Cystic fibrosis transmembrane conductance regulator); CGA (Glycoprotein hormones, alpha polypeptide); CHC1 (Chromosome condensation 1); CHE2 (Cholinesterase (serum) 2); CHGA (Chromogranin A (parathyroid secretory protein 1)); CHH (Cartilage-hair hypoplasia); CHIT1 (Chitinase 1); CHM (Choroideremia (Rab escort protein 1)); CHML (Choroideremia-like (Rab escort protein 2)); CHRM4 (Cholinergic receptor, muscarinic 4); CHRNA1 (Cholinergic receptor, nicotinic, alpha polypeptide 1 (muscle)); CHRNA7 (Cholinergic receptor, nicotinic, alpha polypeptide 7); CHS1 (Chediak-Higashi syndrome 1); CISH (Cytokine inducible SH2-containing protein); CKB (Creatine kinase, brain); CKM (Creatine kinase, muscle); CKN1 (Cockayne syndrome 1 (classical)); CLA1 (Cerebellar ataxia 1 (autosomal recessive)); CLCN1 (Chloride channel 1, skeletal muscle); CLCN4 (Chloride channel 4); CLCNKB (Chloride channel Kb); CLDN3 (Claudin 3); CLN3 (Ceroid-lipofuscinosis, neuronal 3, juvenile (Batten, Spielmeyer-Vogt disease)); CLTA (Clathrin, light polypeptide (Lca)); CLU (Clusterin (complement lysis inhibitor, SP-40,40, sulfated glycoprotein 2, testosterone-repressed prostate message 2, apolipoprotein J)); CMA1 (Chymase 1, mast cell); CMAR (Cell matrix adhesion regulator); CMD1A (Cardiomyopathy, dilated 1A (autosomal dominant)); CMKBR9 (Chemokine (C-C motif) receptor 9); CMKBR9 (Chemokine (C-C motif) receptor 9); CMKLR1 (Chemokine-like receptor 1); CNC (Carney complex, multiple neoplasia and lentiginosis); CNGA1 (Cyclic nucleotide gated channel alpha 1); CNK (Cytokine-inducible kinase); CNP (2',3'-cyclic nucleotide 3' phosphodiesterase); CNTF (Ciliary neurotrophic factor); CNTFR (Ciliary neurotrophic factor receptor); COIL (Coilin p80); COL11A2 (Collagen, type XI, alpha 2); COL17A1 (Collagen, type XVII, alpha 1); COL1A1 (Collagen, type I, alpha 1); COL1A2 (Collagen, type I, alpha 2); COL2A1 (Collagen, type II, alpha 1 (primary osteoarthritis, spondyloepiphyseal dysplasia, congenital)); COL3A1 (Collagen, type III, alpha 1 (Ehlers-Danlos syndrome type IV, autosomal dominant)); COL4A1 (Collagen, type IV, alpha 1); COL4A3 (Collagen, type IV, alpha 3 (Goodpasture antigen)); COL5A1 (Collagen, type V, alpha 1); COL7A1 (Collagen, type VII, alpha 1 (epidermolysis bullosa, dystrophic, dominant and recessive)); COL9A2 (Collagen, type IX, alpha 2); COMT (Catechol-O-methyltransferase); COX4 (Cytochrome c oxidase subunit IV); CP (Ceruloplasmin (ferroxidase)); CP20 (Lymphocyte cytosolic protein, molecular weight 20kD); CPE (Carboxypeptidase E); CPM (Carboxypeptidase M); CPO (Coproporphyrinogen oxidase (coproporphyrin, harderoporphyrin)); CPS1 (Carbamoyl-phosphate synthetase 1, mitochondrial); CR1 (Complement component (3b/4b) receptor 1, including Knops blood group system); CR1L (Complement component (3b/4b) receptor 1-like); CR2 (Complement component (3d/Epstein Barr virus) receptor 2); CREB1 (CAMP responsive element binding protein 1); CREBL1 (CAMP responsive element binding protein-like 1); CREM (CAMP responsive element modulator); CRP (C-

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reactive protein, pentraxin-related); CR3C1 (Cryptidin-related sequence-1C); CRX (Cone-rod homeobox); CRYAB (Crystallin, alpha B); CSBP1 (Cytokine suppressive anti-inflammatory drug binding protein 1 (p38 MAP kinase)); CSE1L (Chromosome segregation 1 (yeast homolog)-like); CSF1 (Colony stimulating factor 1 (macrophage)); CSF1 (Colony stimulating factor 1 (macrophage)); CSF1R (Colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog); CSF2 (Colony stimulating factor 2 (granulocyte-macrophage)); CSF2RA (Colony stimulating factor 2 receptor, alpha, low-affinity (granulocyte-macrophage)); CSF2RB (Colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage)); CSF2RY (Granulocyte-macrophage colony-stimulating factor receptor, alpha); CSF3 (Colony stimulating factor 3 (granulocyte)); CSF3R (Colony stimulating factor 3 receptor (granulocyte)); CSF3R (Colony stimulating factor 3 receptor (granulocyte)); CSH1 (Chorionic somatomammotropin hormone 1 (placental lactogen)); CSMF (Chondrosarcoma, extraskeletal myxoid, fused to EWS in); CSN1 (Casein, alpha); CSN2 (Casein, beta); CSNU (Cystinuria type 3); CSPG2 (Chondroitin sulfate proteoglycan 2 (versican)); CSPG3 (Chondroitin sulfate proteoglycan 3 (neurocan)); CSRP1 (Cysteine and glycine-rich protein 1); CSRP2 (Cysteine and glycine-rich protein 2 (LIM domain only, smooth muscle)); CST3 (Cystatin C (amyloid angiopathy and cerebral hemorrhage)); CSTB (Cystatin B (stefin B)); CTF1 (Cardiotrophin 1); CTGF (Connective tissue growth factor); CTLA4 (Cytotoxic T-lymphocyte-associated protein 4); CTNS (Cystinosis, nephropathic); CTSB (Cathepsin B); CTSC (Cathepsin C); CTSF (Cathepsin F); CTSG (Cathepsin G); CTSK (Cathepsin K (pseudosclerosis)); CTSN (Cathepsin L); CTSS (Cathepsin S); CUBN (Cubilin (intrinsic factor-cobalamin receptor)); CX3CR1 (Chemokine (C-X3-C) receptor 1); CXCR4 (Chemokine (C-X-C motif), receptor 4 (fusin)); CYBA (Cytochrome b-245, alpha polypeptide); CYBB (Cytochrome b-245, beta polypeptide (chronic granulomatous disease)); CYP11A (Cytochrome P450, subfamily XIA (cholesterol side chain cleavage)); CYP11B2 (Cytochrome P450, subfamily XIB (steroid 11-beta-hydroxylase), polypeptide 2); CYP17 (Cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia); CYP19 (Cytochrome P450, subfamily XIX (aromatization of androgens)); CYP1A2 (Cytochrome P450, subfamily I (aromatic compound-inducible), polypeptide 2); CYP1B1 (Cytochrome P450, subfamily I (dioxin-inducible), polypeptide 1 (glaucoma 3, primary infantile)); CYP21 (Cytochrome P450, subfamily XXI (steroid 21-hydroxylase, congenital adrenal hyperplasia)); CYP27A1 (Cytochrome P450, subfamily XXVIIA (steroid 27-hydroxylase, cerebrotendinous xanthomatosis), polypeptide 1); CYP2A (Cytochrome P450, subfamily IIA (phenobarbital-inducible)); CYP2A6 (Cytochrome P450, subfamily IIA (phenobarbital-inducible), polypeptide 6); CYP2C9 (Cytochrome P450, subfamily IIC (mephenytoin 4-hydroxylase), polypeptide 9); CYP2D@ (Cytochrome P450, subfamily IID (debrisoquine, sparteine, etc., -metabolizing) cluster); CYP2E (Cytochrome P450, subfamily IIE (ethanol-inducible)); CYP7A1 (Cytochrome P450, subfamily VIIA (cholesterol 7 alpha-monooxygenase), polypeptide 1); D2S69E (T-lymphocyte activation gene 519); D6S207E (Minor histocompatibility antigen HA-2); D6S2244E (Ke4 gene, mouse, human homolog of); D6S231E (DEK gene); D6S51E (HLA-B associated transcript-2); D6S52E (HLA-B associated transcript-3); D6S54E (HLA-B associated transcript-4); D6S81E (HLA-B associated transcript-1); D6S82E (HLA-B associated transcript-5); DAD1 (Defender against cell death 1); DAF (Decay accelerating factor for complement (CD55, Crimer blood group system)); DAG1 (Dystroglycan 1 (dystrophin-associated glycoprotein 1)); DAO (D-amino-acid oxidase); DAP (Death-associated protein); DAPK1 (Death-associated protein kinase 1); DAPK3 (Death-associated protein kinase 3); DBH (Dopamine beta-hydroxylase (dopamine beta-monooxygenase)); DCC (Deleted in colorectal carcinoma); DCP1 (Dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme)); DCX (Doublecortin; lissencephaly, X-linked (doublecortin)); DDX10 (DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 10 (RNA helicase)); DDX11 (DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 11 (S.cerevisiae CHL1-like helicase)); DEFA1 (Defensin, alpha 1, myeloid-related sequence); DEFA4 (Defensin, alpha 4, corticostatin); DEFA5 (Defensin, alpha 5, Paneth cell-specific); DEFA6 (Defensin, alpha 6, Paneth cell-specific); DEFB1 (Defensin, beta 1); DF (D component of complement (adipsin)); DFFA (DNA fragmentation factor, 45 kD, alpha subunit); DFFB (DNA fragmentation factor, 40 kD, beta subunit); DGCR (DiGeorge syndrome chromosome region); DGI1 (Dentinogenesis imperfecta 1); DHFR (Dihydrofolate reductase); DI (Diego blood group); DIA1 (Diaphorase (NADH) (cytochrome b-5 reductase)); DM (Dystrophin myotonia (includes dystrophin myotonia protein kinase)); DMD (Dystrophin (muscular dystrophy, Duchenne and Becker types), includes DXS142, DXS164, DXS206, DXS230, DXS239, DXS268, DXS269, DXS270, DXS272); DMP1 (Dentin matrix acidic phosphoprotein); DNASE1 (Deoxyribonuclease I); DNASE1L1 (Deoxyribonuclease I-like 1); DNASE1L2 (Deoxyribonuclease I-like 2); DNASE1L3 (Deoxyribonuclease I-like 3); DNASE2 (Deoxyribonuclease II, lysosomal); DNTT (Deoxynucleotidyltransferase, terminal); DOCK1 (Dedicator of cyto-kinesis 1); DPP4 (Dipeptidylpeptidase IV (CD26, adenosine deaminase complexing protein 2)); DPYD (Dihydropyrimidine dehydrogenase); DRA (Down-regulated in adenoma); DRD2 (Dopamine receptor D2); DRD3 (Dopamine receptor D3); DRD4 (Dopamine receptor D4); DSG1 (Desmoglein 1); DSG3 (Desmoglein 3 (pemphigus vulgaris antigen)); DSP (Desmoplakin (DPI, DPII)); DTD (Diastrophic dysplasia); DTNA (Dystrobrevin, alpha); DTR (Diphtheria toxin receptor (heparin-binding epidermal growth factor-like growth factor)); DXS423E (Segregation of mitotic chromosomes 1 (SMC1, yeast human homolog of)); DXS435E (A-11 gene); DYS (Dysautonomia (Riley-Day syndrome, hereditary sensory autonomic neuropathy type III)); DYX2 (Dyslexia 2); E2F1 (E2F transcription factor 1); EBF (Early B-cell factor); ECB2); ECGF1 (Endothelial cell growth factor 1 (platelet-derived)); ED1

(Ectodermal dysplasia 1, anhidrotic); EDG1 (Endothelial differentiation, sphingolipid G-protein-coupled receptor, 1); EDN1 (Endothelin 1); EEC2 (Ectrodactyly, ectodermal dysplasia and cleft lip/palate syndrome 2); EGR1 (Early growth response 1); EGR2 (Early growth response 2 (Krox-20 (Drosophila) homolog)); EIF3S6 (Eukaryotic translation initiation factor 3, subunit 6 (48kD)); EIF4G1 (Eukaryotic translation initiation factor 4 gamma, 1); EIF4G2 (Eukaryotic translation initiation factor 4 gamma, 2); EIF5A (Eukaryotic translation initiation factor 5A); EJM1 (Epilepsy, juvenile myoclonic 1); ELA2 (Elastase 2, neutrophil); ELANH2 (Protease inhibitor 2 (anti-elastase), monocyte/neutrophil); ELAVL2 (ELAV (embryonic lethal, abnormal vision, Drosophila)-like 2); ELAVL4 (ELAV (embryonic lethal, abnormal vision, Drosophila)-like 4 (Hu antigen D)); ELN (Elastin (supravalvular aortic stenosis, Williams-Beuren syndrome)); ENG (Endoglin (Osler-Rendu-Weber syndrome 1)); ENPEP (Glutamyl aminopeptidase (aminopeptidase A)); EPB41 (Erythrocyte membrane protein band 4.1 (elliptocytosis 1, RH-linked)); EPB42 (Erythrocyte membrane protein band 4.2); EPHA3 (EphA3); EPHX1 (Epoxide hydrolase 1, microsomal (xenobiotic)); EPHX2 (Epoxide hydrolase 2, cytoplasmic); EPO (Erythropoietin); EPOR (Erythropoietin receptor); EPOR (Erythropoietin receptor); EPOR (Erythropoietin receptor); EPS15 (Epidermal growth factor receptor pathway substrate 15); EPT (Epilepsy, partial); ERBB2 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 2 (neuro/glioblastoma derived oncogene homolog)); ERCC1 (Excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)); ERCC2 (Excision repair cross-complementing rodent repair deficiency, complementation group 2 (xeroderma pigmentosum D)); ERCC3 (Excision repair cross-complementing rodent repair deficiency, complementation group 3 (xeroderma pigmentosum group B complementing)); ERCC4 (Excision repair cross-complementing rodent repair deficiency, complementation group 4); ERCC5 (Excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))); ES1 (ES1 (zebrafish) protein, human homolog of); ESB3 (Esterase B3); ESD (Esterase D/formylglutathione hydrolase); ESR1 (Estrogen receptor 1); ESR2 (Estrogen receptor 2 (ER beta)); ETV4 (Ets variant gene 4 (E1A enhancer-binding protein, E1AF)); ETV6 (Ets variant gene 6 (TEL oncogene)); EYCL3 (Eye color 3 (brown)); F10 (Coagulation factor X); F11 (Coagulation factor XI (plasma thromboplastin antecedent)); F12 (Coagulation factor XII (Hageman factor)); F13A1 (Coagulation factor XIII, A1 polypeptide); F13B (Coagulation factor XIII, B polypeptide); F2 (Coagulation factor II (thrombin)); F2R (Coagulation factor II (thrombin) receptor); F2RL2 (Coagulation factor II (thrombin) receptor-like 2); F3 (Coagulation factor III (thromboplastin, tissue factor)); F5 (Coagulation factor V (proaccelerin, labile factor)); F7 (Coagulation factor VII (serum prothrombin conversion accelerator)); F7R (Coagulation factor VII regulator); F8A (Factor VIII associated gene); F8C (Coagulation factor VIIIc, procoagulant component (hemophilia A)); F9 (Coagulation factor IX (plasma thromboplastic component, Christmas disease, hemophilia B)); FABP1 (Fatty acid binding protein 1, liver); FABP2 (Fatty acid binding protein 2, intestinal); FABP6 (Fatty acid binding protein 6, ileal (gastrotropin)); FADD (Fas (TNFRSF6)-associated via death domain); FAH (Fumarylacetoacetate); FANCA (Fanconi anemia, complementation group A); FANCB (Fanconi anemia, complementation group B); FANCC (Fanconi anemia, complementation group C); FANCE (Fanconi anemia, complementation group E); FANCG (Fanconi anemia, complementation group G); FAT (FAT tumor suppressor (Drosophila) homolog); FBLN1 (Fibulin 1); FBN1 (Fibrillin 1 (Marfan syndrome)); FBP1 (Fructose-bisphosphatase 1); FCAR (Fc fragment of IgA, receptor for); FCER1A (Fc fragment of IgE, high affinity I, receptor for; alpha polypeptide); FCER1B (Fc fragment of IgE, high affinity I, receptor for; beta polypeptide); FCER2 (Fc fragment of IgE, low affinity II, receptor for (CD23A)); FCGR1A (Fc fragment of IgG, high affinity Ia, receptor for (CD64)); FCGR1B (Fc fragment of IgG, high affinity Ib, receptor for (CD64)); FCGR1B (Fc fragment of IgG, high affinity Ib, receptor for (CD64)); FCGR2A (Fc fragment of IgG, low affinity IIa, receptor for (CD32)); FCGR2B (Fc fragment of IgG, low affinity IIb, receptor for (CD32)); FCGR2C (Fc fragment of IgG, low affinity IIb, receptor for (CD32)); FCGR3A (Fc fragment of IgG, low affinity IIIa, receptor for (CD16)); FCGR3B (Fc fragment of IgG, low affinity IIIb, receptor for (CD16)); FCN1 (Ficolin (collagen/fibrinogen domain-containing) 1); FDH (Formaldehyde dehydrogenase); FEA (F9 embryonic antigen); FEB1 (Febrile convulsions 1febrile convulsions 1); FECH (Ferrochelatase (protoporphyrin)); FES (Feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fps) oncogene homolog); FGA (Fibrinogen, A alpha polypeptide); FGB (Fibrinogen, B beta polypeptide); FGF1 (Fibroblast growth factor 1 (acidic)); FGF9 (Fibroblast growth factor 9 (glia-activating factor)); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR3 (Fibroblast growth factor receptor 3 (achondroplasia, thanatophoric dwarfism)); FGG (Fibrinogen, gamma polypeptide); FGR (Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog); FHR2 (Factor H-related gene 2); FKHR (Forkhead (Drosophila) homolog 1 (rhabdomyosarcoma)); FLG (Filaggrin); FLNB (Filamin B, beta (actin-binding protein-278)); FLT3 (Fms-related tyrosine kinase 3); FLT3LG (Fms-related tyrosine kinase 3 ligand); FMO1 (Flavin containing monooxygenase 1); FMO3 (Flavin containing monooxygenase 3); FN1 (Fibronectin 1); FOLR1 (Folate receptor 1 (adult)); FOS (V-fos FBJ murine osteosarcoma viral oncogene homolog); FOSB (FBJ murine osteosarcoma viral oncogene homolog B); FPDMM); FPR1 (Formyl peptide receptor 1); FPR1 (Formyl peptide receptor-like 1); FR (Froese blood group); FRAP1 (FK506 binding protein 12-rapamycin associated protein 1); FRDA (Friedreich ataxia); FRG1 (FSHD region gene 1); FSHMD1A (Facioscapulohumeral muscular dystrophy 1A); FTL (Ferritin, light polypeptide); FTNB (Fertilin beta (a

integrin and metalloproteinase domain 2)); FUC1 (Fucosidase, alpha-L-1, tissue); FUC2 (Fucosidase, alpha-L-2, plasma); FUT2 (Fucosyltransferase 2 (secretor status included)); FUT3 (Fucosyltransferase 3 (galactoside 3(4)-L-fucosyltransferase, Lewis blood group included)); FXR1 (Fragile X mental retardation, autosomal homolog); DAD1 (Defender against cell death 1); DAF (Decay accelerating factor for complement (CD55, Cromer blood group system)); DAG1 (Dystroglycan 1 (dystrophin-associated glycoprotein 1)); DAO (D-amino-acid oxidase); DAP (Death-associated protein); DAPK1 (Death-associated protein kinase 1); DAPK3 (Death-associated protein kinase 3); DBH (Dopamine beta-hydroxylase (dopamine beta-monoxygenase)); DCC (Deleted in colorectal carcinoma); DCP1 (Dipeptidyl carboxypeptidase 1 (angiotensin I converting enzyme)); DCX (Doublecortex; lissencephaly, X-linked (doublecortin)); DDX10 (DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 10 (RNA helicase)); DDX11 (DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 11 (S.cerevisiae CHL1-like helicase)); DEFA1 (Defensin, alpha 1, myeloid-related sequence); DEFA4 (Defensin, alpha 4, corticostatin); DEFA5 (Defensin, alpha 5, Paneth cell-specific); DEFA6 (Defensin, alpha 6, Paneth cell-specific); DEFB1 (Defensin, beta 1); DF (D component of complement (adipsin)); DFFA (DNA fragmentation factor, 45 kD, alpha subunit); DFFB (DNA fragmentation factor, 40 kD, beta subunit); DGCR (DiGeorge syndrome chromosome region); DGI1 (Dentinogenesis imperfecta 1); DHFR (Dihydrofolate reductase); DI (Diego blood group); DIA1 (Diaphorase (NADH) (cytochrome b-5 reductase)); DM (Dystrophia myotonica (includes dystrophia myotonia protein kinase)); DMD (Dystrophin (muscular dystrophy, Duchenne and Becker types), includes DXS142, DXS164, DXS206, DXS230, DXS239, DXS268, DXS269, DXS270, DXS272); DMP1 (Dentin matrix acidic phosphoprotein); DNASE1 (Deoxyribonuclease I); DNASE1L1 (Deoxyribonuclease I-like 1); DNASE1L2 (Deoxyribonuclease I-like 2); DNASE1L3 (Deoxyribonuclease I-like 3); DNASE2 (Deoxyribonuclease II, lysosomal); DNTT (Deoxynucleotidyltransferase, terminal); DOCK1 (Dedicator of cyto-kinesis 1); DPP4 (Dipeptidylpeptidase IV (CD26, adenosine deaminase complexing protein 2)); DPYD (Dihydropyrimidine dehydrogenase); DRA (Down-regulated in adenoma); DRD2 (Dopamine receptor D2); DRD3 (Dopamine receptor D3); DRD4 (Dopamine receptor D4); DSG1 (Desmoglein 1); DSG3 (Desmoglein 3 (pemphigus vulgaris antigen)); DSP (Desmoplakin (DPI, DPII)); DTD (Diastrophic dysplasia); DTNA (Dystrobrevin, alpha); DTR (Diphtheria toxin receptor (heparin-binding epidermal growth factor-like growth factor)); DXS423E (Segregation of mitotic chromosomes 1 (SMC1, yeast human homolog of)); DXS435E (A-11 gene); DYS (Dysautonomia (Riley-Day syndrome, hereditary sensory autonomic neuropathy type III)); DYX2 (Dyslexia 2); E2F1 (E2F transcription factor 1); EBF (Early B-cell factor ECB2); ECGF1 Endothelial cell growth factor 1 (platelet-derived)); ED1 (Ectodermal dysplasia 1, anhidrotic); EDG1 (Endothelial differentiation, sphingolipid); G-protein-coupled receptor, 1); EDN1 (Endothelin 1); EEC2 (Ectrodactyly, ectodermal dysplasia and cleft lip/palate syndrome 2); EGR1 (Early growth response 1); EGR2 (Early growth response 2 (Krox-20 (Drosophila) homolog)); EIF3S6 (Eukaryotic translation initiation factor 3, subunit 6 (48kD)); EIF4G1 (Eukaryotic translation initiation factor 4 gamma, 1); EIF4G2 (Eukaryotic translation initiation factor 4 gamma, 2); EIF5A (Eukaryotic translation initiation factor 5A); EJM1 (Epilepsy, juvenile myoclonic 1); ELA2 (Elastase 2, neutrophil); ELANH2 (Protease inhibitor 2 (anti-elastase), monocyte/neutrophil); ELAVL2 (ELAV (embryonic lethal, abnormal vision, Drosophila)-like 2); ELAVL4 (ELAV (embryonic lethal, abnormal vision, Drosophila)-like 4 (Hu antigen D)); ELN (Elastin (supravalvular aortic stenosis, Williams-Beuren syndrome)); ENG (Endoglin (Osler-Rendu-Weber syndrome 1)); ENPEP (Glutamyl aminopeptidase (aminopeptidase A)); EPB41 (Erythrocyte membrane protein band 4.1 (elliptocytosis 1, RH-linked)); EPB42 (Erythrocyte membrane protein band 4.2); EPHA3 (EphA3); EPHX1 (Epoxide hydrolase 1, microsomal (xenobiotic)); EPHX2 (Epoxide hydrolase 2, cytoplasmic); EPO (Erythropoietin); EPOR (Erythropoietin receptor); EPOR (Erythropoietin receptor); EPOR (Erythropoietin receptor); EPS15 (Epidermal growth factor receptor pathway substrate 15); EPT (Epilepsy, partial); ERBB2 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 2 (neuro/glioblastoma derived oncogene homolog)); ERCC1 (Excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)); ERCC2 (Excision repair cross-complementing rodent repair deficiency, complementation group 2 (xeroderma pigmentosum D)); ERCC3 (Excision repair cross-complementing rodent repair deficiency, complementation group 3 (xeroderma pigmentosum group B complementing)); ERCC4 (Excision repair cross-complementing rodent repair deficiency, complementation group 4); ERCC5 (Excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))); ES1 (ES1 (zebrafish) protein, human homolog of); ESB3 (Esterase B3); ESD (Esterase D/formylglutathione hydrolase); ESR1 (Estrogen receptor 1); ESR2 (Estrogen receptor 2 (ER beta)); ETV4 (Ets variant gene 4 (E1A enhancer-binding protein, E1AF)); ETV6 (Ets variant gene 6 (TEL oncogene)); EYCL3 (Eye color 3 (brown)); F10 (Coagulation factor X); F11 (Coagulation factor XI (plasma thromboplastin antecedent)); F12 (Coagulation factor XII (Hageman factor)); F13A1 (Coagulation factor XIII, A1 polypeptide); F13B (Coagulation factor XIII, B polypeptide); F2 (Coagulation factor II (thrombin)); F2R (Coagulation factor II (thrombin) receptor); F2RL2 (Coagulation factor II (thrombin) receptor-like 2); F3 (Coagulation factor III (thromboplastin, tissue factor)); F5 (Coagulation factor V (proaccelerin, labile factor)); F7 (Coagulation factor VII (serum prothrombin conversion accelerator)); F7R (Coagulation factor VII regulator); F8A (Factor VIII associated gene); F8C (Coagulation factor VIIIc, procoagulant component (hemophilia A)); F9 (Coagulation factor IX (plasma thromboplastic component, Christmas disease, hemophilia B)); FABP1 (Fatty acid binding

protein 1, liver); FABP2 (Fatty acid binding protein 2, intestinal); FABP6 (Fatty acid binding protein 6, ileal (gastrotropin)); FADD (Fas (TNFRSF6)-associated via death domain); FAH (Fumarylacetoacetate); FANCA (Fanconi anemia, complementation group A); FANCB (Fanconi anemia, complementation group B); FANCC (Fanconi anemia, complementation group C); FANCE (Fanconi anemia, complementation group E); FANCG (Fanconi anemia, complementation group G); FAT (FAT tumor suppressor (*Drosophila*) homolog); FBLN1 (Fibulin 1); FBN1 (Fibrillin 1 (Marfan syndrome)); FBP1 (Fructose-bisphosphatase 1); FCAR (Fc fragment of IgA, receptor for); FCER1A (Fc fragment of IgE, high affinity I, receptor for; alpha polypeptide); FCER1B (Fc fragment of IgE, high affinity I, receptor for; beta polypeptide); FCER2 (Fc fragment of IgE, low affinity II, receptor for (CD23A)); FCGR1A (Fc fragment of IgG, high affinity Ia, receptor for (CD64)); FCGR1B (Fc fragment of IgG, high affinity Ib, receptor for (CD64)); FCGR2A (Fc fragment of IgG, low affinity IIa, receptor for (CD32)); FCGR2B (Fc fragment of IgG, low affinity IIb, receptor for (CD32)); FCGR2C (Fc fragment of IgG, low affinity IIb, receptor for (CD32)); FCGR3A (Fc fragment of IgG, low affinity IIIa, receptor for (CD16)); FCGR3B (Fc fragment of IgG, low affinity IIIb, receptor for (CD16)); FCN1 (Ficolin (collagen/fibrinogen domain-containing) 1); FDH (Formaldehyde dehydrogenase); FEA (F9 embryonic antigen); FEB1 (Febrile convulsions 1 febrile convulsions 1); FECH (Ferrochelatase (protoporphyrin)); FES (Feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fps) oncogene homolog); FGA (Fibrinogen, A alpha polypeptide); FGB (Fibrinogen, B beta polypeptide); FGF1 (Fibroblast growth factor 1 (acidic)); FGF9 (Fibroblast growth factor 9 (glia-activating factor)); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR3 (Fibroblast growth factor receptor 3 (achondroplasia, thanatophoric dwarfism)); FGG (Fibrinogen, gamma polypeptide); FGR (Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog); FHR2 (Factor H-related gene 2); FKHR (Forkhead (*Drosophila*) homolog 1 (rhabdomyosarcoma)); FLG (Filaggrin); FLNB (Filamin B, beta (actin-binding protein-278)); FLT3 (Fms-related tyrosine kinase 3); FLT3LG (Fms-related tyrosine kinase 3 ligand); FMO1 (Flavin containing monooxygenase 1); FMO3 (Flavin containing monooxygenase 3); FN1 (Fibronectin 1); FOLR1 (Folate receptor 1 (adult)); FOS (V-fos FBJ murine osteosarcoma viral oncogene homolog); FOSB (FBJ murine osteosarcoma viral oncogene homolog B); FPDMM; FPR1 (Formyl peptide receptor 1); FPRL1 (Formyl peptide receptor-like 1); FR (Froese blood group); FRAP1 (FK506 binding protein 12-rapamycin associated protein); FRDA (Friedreich ataxia); FRG1; FSHD region gene 1); FSHMD1A (Facioscapulohumeral muscular dystrophy 1A); FTL (Ferritin, light polypeptide); FTNB (Fertilin beta (a disintegrin and metalloproteinase domain 2)); FUCA1 (Fucosidase, alpha-L- 1, tissue); FUCA2 (Fucosidase, alpha-L- 2, plasma); FUT2 (Fucosyltransferase 2 (secretor status included)); FUT3 (Fucosyltransferase 3 (galactoside); 3(4)-L-fucosyltransferase, Lewis blood group included)); FXR1 (Fragile X mental retardation, autosomal homolog); FY (Duffy blood group); FYB (FYN-binding protein (FYB-120/130)); G22P1 (Thyroid autoantigen 70kD (Ku antigen)); G6PD (Glucose-6-phosphate dehydrogenase); GAA (Glucosidase, alpha; acid (Pompe disease, glycogen storage disease type II)); GABRA5 (Gamma-aminobutyric acid (GABA) A receptor, alpha 5); GABRA6 (Gamma-aminobutyric acid (GABA) A receptor, alpha 6); GABRB1 (Gamma-aminobutyric acid (GABA) A receptor, beta 1); GAD2 (Glutamate decarboxylase 2 (pancreatic islets and brain, 65kD)); GALT (Galactose-1-phosphate uridylyltransferase); GANC (Glucosidase, alpha; neutral C); GAS (Gastrin); GAS6 (Growth arrest-specific 6); GATA3 (GATA-binding protein 3); GBA (Glucosidase, beta; acid (includes glucosylceramidase)); GC (Group-specific component (vitamin D binding protein)); GCDH (Glutaryl-Coenzyme A dehydrogenase); GCGR (Glucagon receptor); GCK (Glucokinase (hexokinase 4, maturity onset diabetes of the young 2)); GCP (Green cone pigment (color blindness, deutan)); GDH (Glucose dehydrogenase); GEM (GTP-binding protein overexpressed in skeletal muscle); GFII (Growth factor independent 1); GGCX (Gamma-glutamyl carboxylase); GGT1 (Gamma-glutamyltransferase 1); GGTA1 (Glycoprotein, alpha-galactosyltransferase 1); GH1 (Growth hormone 1); GH2 (Growth hormone 2); GHR (Growth hormone receptor); GIF (Gastric intrinsic factor (vitamin B synthesis)); GLA (Galactosidase, alpha); GLC1B (Glaucoma 1, open angle, B (adult-onset)); GLCLC (Glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)); GLO1 (Glyoxalase I); GLP1R (Glucagon-like peptide 1 receptor); GLRB (Glycine receptor, beta); GLS (Glutaminase); GLUD1 (Glutamate dehydrogenase 1); GLYB (Glycine B complementing); GLYS1 (Glycosuria 1, renal); GNAQ (Guanine nucleotide binding protein (G protein), q polypeptide); GNAS1 (Guanine nucleotide binding protein (G protein), alpha stimulating activity polypeptide 1); GNB3 (Guanine nucleotide binding protein (G protein), beta polypeptide 3); GNL1 (Guanine nucleotide binding protein-like 1); GOT2 (Glutamic-oxaloacetic transaminase 2, mitochondrial (aspartate aminotransferase 2)); GP1BA (Glycoprotein Ib (platelet), alpha polypeptide); GP1BB (Glycoprotein Ib (platelet), beta polypeptide); GP9 (Glycoprotein IX (platelet)); GPD2 (Glycerol-3-phosphate dehydrogenase 2 (mitochondrial)); GPR10 (G protein-coupled receptor 10); GPR13 (G protein-coupled receptor 13); GPR15 (G protein-coupled receptor 15); GPR2 (G protein-coupled receptor 2); GPR30 (G protein-coupled receptor 30); GPR4 (G protein-coupled receptor 4); GPR5 (G protein-coupled receptor 5); GPR9 (G protein-coupled receptor 9); GPT (Glutamic-pyruvate transaminase (alanine aminotransferase)); GPX1 (Glutathione peroxidase 1); GPX2 (Glutathione peroxidase 2 (gastrointestinal)); GRB10 (Growth factor receptor-bound protein 10); GRB14 (Growth factor receptor-bound protein 14); GRIK1 (Glutamate receptor, ionotropic, kainate 1); GRIK2 (Glutamate receptor, ionotropic, kainate 2); GRL

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(Glucocorticoid receptor); GRO1 (GRO1 oncogene (melanoma growth stimulating activity, alpha)); GRO2 (GRO2 oncogene); GRO3 (GRO3 oncogene); GRPR (Gastrin-releasing peptide receptor); GSN (Gelsolin (amyloidosis, Finnish type)); GSPT1 (G1 to S phase transition 1); GSR (Glutathione reductase); GSS (Glutathione synthetase); GSTA1 (Glutathione S-transferase A1); GSTA2 (Glutathione S-transferase A2); GSTA4 (Glutathione S-transferase A4); GSTM1 (Glutathione S-transferase M1); GSTM2 (Glutathione S-transferase M2 (muscle)); GSTM3 (Glutathione S-transferase M3 (brain)); GSTP1 (Glutathione S-transferase pi); GSTT1 (Glutathione S-transferase theta 1); GTF2H2 (General transcription factor IIH, polypeptide 2 (44kD subunit)); GTS (Gilles de la Tourette syndrome); GUCY1A3 (Guanylate cyclase 1, soluble, alpha 3); GUCY2D (Guanylate cyclase 2D, membrane (retina-specific)); GUSB (Glucuronidase, beta); GYPA (Glycophorin A (includes MN blood group)); GYPB (Glycophorin B (includes Ss blood group)); GYS1 (Glycogen synthase 1 (muscle)); GZMA (Granzyme A (granzyme 1, cytotoxic T-lymphocyte-associated serine esterase 3)); GZMB (Granzyme B (granzyme 2, cytotoxic T-lymphocyte-associated serine esterase 1)); GZMM (Granzyme M (lymphocyte met-ase 1)); H142T (Temperature sensitivity complementation, H142); HADHA (Hydroxyacyl-Coenzyme A dehydrogenase/3-ketoacyl-Coenzyme A thiolase/enoyl-Coenzyme A hydratase (trifunctional protein), alpha subunit); HADHSC (L-3-hydroxyacyl-Coenzyme A dehydrogenase, short chain); HAGH (Hydroxyacyl glutathione hydrolase; glyoxalase 2); HAL (Histidine ammonia-lyase); HBA1 (Hemoglobin, alpha 1); HBB (Hemoglobin, beta); HBG1 (Hemoglobin, gamma A); HBZ (Hemoglobin, zeta); HCF2 (Heparin cofactor II); HCFC1 (Host cell factor C1 (VP16-accessory protein)); HCR (Chemokine receptor); HD (Huntingtin (Huntington disease)); HDAC1 (Histone deacetylase 1); HEXA (Hexosaminidase A (alpha polypeptide)); HEXB (Hexosaminidase B (beta polypeptide)); HF1 (H factor 1 (complement)); HFE (Hemochromatosis); HFL1 (H factor (complement)-like 1); HGF (Hepatocyte growth factor (hepatopoietin A; scatter factor)); HGL (Heregulin, alpha (45kD, ERBB2 p185-activator)); HIP1 (Huntingtin interacting protein 1); HIVEP1 (Human immunodeficiency virus type I enhancer-binding protein 1); HK1 (Hexokinase 1); HK2 (Hexokinase 2); HK3 (Hexokinase 3 (white cell)); HLA-A (Major histocompatibility complex, class I, A); HLA-B (Major histocompatibility complex, class I, B); HLA-C (Major histocompatibility complex, class I, C); HLA-DMA (Major histocompatibility complex, class II, DM alpha); HLA-DMB (Major histocompatibility complex, class II, DM beta); HLA-DNA (Major histocompatibility complex, class II, DN alpha); HLA-DOB (Major histocompatibility complex, class II, DO beta); HLA-DPA1 (Major histocompatibility complex, class II, DP alpha 1); HLA-DPB1 (Major histocompatibility complex, class II, DP beta 1); HLA-DQA1 (Major histocompatibility complex, class II, DQ alpha 1); HLA-DQB1 (Major histocompatibility complex, class II, DQ beta 1); HLA-DRA (Major histocompatibility complex, class II, DR alpha); HLA-DRB1 (Major histocompatibility complex, class II, DR beta 1); HLA-E (Major histocompatibility complex, class I, E); HLA-F (Major histocompatibility complex, class I, F); HLA-G (HLA-G histocompatibility antigen, class I, G); HLALS (Major histocompatibility complex, class I-like sequence (NOTE: symbol provisional)); HLCS (Holocarboxylase synthetase (biotin-[propionyl-Coenzyme A-carboxylase (ATP-hydrolysing)] ligase)); HLX1 (H2.0 (Drosophila)-like homeo box 1); HM74 (Putative chemokine receptor; GTP-binding protein); HMAB (Monocyte antigen B); HMBS (Hydroxymethylbilane synthase); HMGCL (3-hydroxymethyl-3-methylglutaryl-Coenzyme A lyase (hydroxymethylglutaricaciduria)); HMGIC (High-mobility group (nonhistone chromosomal) protein isoform I-C); HMSNL); HMX1 (Homeo box (H6 family) 1); HNRPD (Heterogeneous nuclear ribonucleoprotein D); HOXB5 (Homeo box B5); HOXD13 (Homeo box D13); HOXD8 (Homeo box D8); HP (Haptoglobin); HPE1 (Holoprosencephaly 1, alobar); HPN (Hepsin (transmembrane protease, serine 1)); HPR (Haptoglobin-related protein); HPRT1 (Hypoxanthine phosphoribosyltransferase 1 (Lesch-Nyhan syndrome)); HPS (Hermansky-Pudlak syndrome); HPX (Hemopexin); HR (Hairless (mouse) homolog); HRAS (V-Ha-ras Harvey rat sarcoma viral oncogene homolog); HRG (Histidine-rich glycoprotein); HRMT1L1 (HMT1 (hnRNP methyltransferase, *S. cerevisiae*)-like 1); HRMT1L2 (HMT1 (hnRNP methyltransferase, *S. cerevisiae*)-like 2); HRY (Hairy (Drosophila)-homolog); HSD17B3 (Hydroxysteroid (17-beta) dehydrogenase 3); HSD3B1 (Hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1); HSD3B2 (Hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2); HSPA1A (Heat shock 70kD protein 1); HSPA1L (Heat shock 70kD protein-like 1); HSPA2 (Heat shock 70kD protein 2); HSPA6 (Heat shock 70kD protein 6 (HSP70B')); HSPG2 (Heparan sulfate proteoglycan 2 (perlecan)); HTLVR (Human T-cell leukemia virus (I and II) receptor); HTN1 (Histatin 1); HTN3 (Histatin 3); HTR2A (5-hydroxytryptamine (serotonin) receptor 2A); HTR2C (5-hydroxytryptamine (serotonin) receptor 2C); HTR6 (5-hydroxytryptamine (serotonin) receptor 6); HTR7 (5-hydroxytryptamine (serotonin) receptor 7 (adenylate cyclase-coupled)); HVBS6 (Hepatitis B virus integration site 6); HY (Histocompatibility Y antigen); IARS (Isoleucine-tRNA synthetase); IBD1 (Inflammatory bowel disease 1); IBSP (Integrin-binding sialoprotein (bone sialoprotein, bone sialoprotein II)); ICAM1 (Intercellular adhesion molecule 1 (CD54), human rhinovirus receptor); ICAM2 (Intercellular adhesion molecule 2); ICAM3 (Intercellular adhesion molecule 3); ICAM4 (Intercellular adhesion molecule 4, Landsteiner-Wiener blood group); ICAM5 (Intercellular adhesion molecule 5, telencephalin); ICR5 (Ichthyosis congenita V, Sjogren-Larsson-like); ICS1 (Immotile cilia syndrome 1); ICT1 (Immature colon carcinoma transcript 1); IDDM10 (Insulin-dependent diabetes mellitus 10); IDDM11 (Insulin-dependent diabetes mellitus 11); IDDM15 (Insulin-dependent diabetes mellitus 15); IDDM17 (Insulin-dependent diabetes mellitus 17); IDDM4 (Insulin-dependent diabetes mellitus 4); IDDM6 (Insulin-dependent diabetes mellitus 6); IDDM7

(Insulin-dependent diabetes mellitus 7); IDDMX (Diabetes mellitus, insulin-dependent, X-linked, susceptibility to); IDH1 (Isocitrate dehydrogenase 1 (NADP+), soluble); IDS (Iduronate 2-sulfatase (Hunter syndrome)); IDUA (Iduronidase, alpha-L-); IF (I factor (complement)); IFNA1 (Interferon, alpha 1); IFNA10 (Interferon, alpha 10); IFNA13 (Interferon, alpha 13); IFNA2 (Interferon, alpha 2); IFNAR1 (Interferon (alpha, beta and omega) receptor 1); IFNAR2 (Interferon (alpha, beta and omega) receptor 2); IFNG (Interferon, gamma); IFNGR1 (Interferon gamma receptor 1); IFNGR2 (Interferon gamma receptor 2 (interferon gamma transducer 1)); IFNR (Interferon production regulator); IGAT (Immune response to synthetic polypeptide--IRGAT); IGER (IgE responsiveness (atopic)); IGES (Immunoglobulin E concentration, serum); IGF1 (Insulin-like growth factor 1 (somatomedin C)); IGF1R (Insulin-like growth factor 1 receptor); IGF2 (Insulin-like growth factor 2 (somatomedin A)); IGF2R (Insulin-like growth factor 2 receptor); IGFBP1 (Insulin-like growth factor binding protein 1); IGFBP10 (Insulin-like growth factor binding protein 10); IGFBP2 (Insulin-like growth factor binding protein 2 (36kD)); IGFBP3 (Insulin-like growth factor binding protein 3); IGHA1 (Immunoglobulin alpha 1); IGHA2 (Immunoglobulin alpha 2 (A2M marker)); IGHE (Immunoglobulin epsilon); IGHG1 (Immunoglobulin gamma 1 (Gm marker)); IGHG2 (Immunoglobulin gamma 2 (Gm marker)); IGHV@ (Immunoglobulin heavy polypeptide, variable region (cluster)); IGJ (Immunoglobulin J polypeptide, linker protein for immunoglobulin alpha and mu polypeptides); IGKC (Immunoglobulin kappa constant region); IGKV (Immunoglobulin kappa variable region); IGLP1 (Immune response to synthetic polypeptides-1); IGLP2 (Immune response to synthetic polypeptides-2); IL10 (Interleukin 10); IL10RA (Interleukin 10 receptor, alpha); IL10RB (Interleukin 10 receptor, beta); IL11 (Interleukin 11); IL11RA (Interleukin 11 receptor, alpha); IL11RB (Interleukin 11 receptor, beta); IL12A (Interleukin 12A (natural killer cell stimulatory factor 1, cytotoxic lymphocyte maturation factor 1, p35)); IL12B (Interleukin 12B (natural killer cell stimulatory factor 2, cytotoxic lymphocyte maturation factor 2, p40)); IL12RB1 (Interleukin 12 receptor, beta 1); IL12RB2 (Interleukin 12 receptor, beta 2); IL13 (Interleukin 13); IL13RA1 (Interleukin 13 receptor, alpha 1); IL13RA2 (Interleukin 13 receptor, alpha 2); IL15 (Interleukin 15); IL15RA (Interleukin 15 receptor, alpha); IL15RB (Interleukin 15 receptor, beta); IL16 (Interleukin 16 (lymphocyte chemoattractant factor)); IL17 (Interleukin 17 (cytotoxic T-lymphocyte-associated serine esterase 8)); IL18 (Interleukin 18 (interferon-gamma-inducing factor)); IL18BP (Interleukin 18 binding protein); IL18R1 (Interleukin 18 receptor 1); IL18RAP (Interleukin 18 receptor accessory protein); IL1A (Interleukin 1, alpha); IL1B (Interleukin 1, beta); IL1R1 (Interleukin 1 receptor, type I); IL1R2 (Interleukin 1 receptor, type II); IL1RA (Interleukin 1 receptor accessory protein); IL1RL2 (Interleukin 1 receptor-like 2); IL1RN (Interleukin 1 receptor antagonist); IL2 (Interleukin 2); IL2RA (Interleukin 2 receptor, alpha); IL2RB (Interleukin 2 receptor, beta); IL2RG (Interleukin 2 receptor, gamma (severe combined immunodeficiency)); IL3 (Interleukin 3 (colony-stimulating factor, multiple)); IL3RA (Interleukin 3 receptor, alpha (low affinity)); IL4 (Interleukin 4); IL4R (Interleukin 4 receptor); IL5 (Interleukin 5 (colony-stimulating factor, eosinophil)); IL5RA (Interleukin 5 receptor, alpha); IL6 (Interleukin 6 (interferon, beta 2)); IL6R (Interleukin 6 receptor); IL6ST (Interleukin 6 signal transducer (gp130, oncostatin M receptor)); IL7 (Interleukin 7); IL7R (Interleukin 7 receptor); IL8 (Interleukin 8); IL8RA (Interleukin 8 receptor, alpha); IL8RB (Interleukin 8 receptor, beta); IL9 (Interleukin 9); IL9R (Interleukin 9 receptor); ILF1 (Interleukin enhancer binding factor 1); ILF2 (Interleukin enhancer binding factor 2, 45kD); ILF3 (Interleukin enhancer binding factor 3, 90kD); IMPA1 (Inositol(myo)-1(or 4)-monophosphatase 1); IMPT1 (Imprinted polyspecific membrane transporter 1); INLU (Lutheran inhibitor, dominant (monoclonal antibody A3D8)); INP10 (Interferon (gamma)-induced cell line; protein 10 from INPP5D Inositol polyphosphate-5-phosphatase, 145kD); INS (Insulin); INSR (Insulin receptor); IPF1 (Insulin promoter factor 1, homeodomain transcription factor); IPOX (Intestinal pseudoobstruction, neuronal, primary idiopathic); IRAK1 (Interleukin-1 receptor-associated kinase 1); IRAK2 (Interleukin-1 receptor-associated kinase 2); IRF4 (Interferon regulatory factor 4); IRS1 (Insulin receptor substrate 1); ITGA1 (Integrin, alpha 1); ITGA2 (Integrin, alpha 2 (CD49B, alpha 2 subunit of VLA-2 receptor)); ITGA2B (Integrin, alpha 2b (platelet glycoprotein IIb of IIb/IIIa complex, antigen CD41B)); ITGA4 (Integrin, alpha 4 (antigen CD49D, alpha 4 subunit of VLA-4 receptor)); ITGA5 (Integrin, alpha 5 (fibronectin receptor, alpha polypeptide)); ITGA6 (Integrin, alpha 6); ITGA7 (Integrin, alpha 7); ITGAD (Integrin, alpha D); ITGAL (Integrin, alpha L (antigen CD11A (p180), lymphocyte function-associated antigen 1; alpha polypeptide)); ITGAM (Integrin, alpha M (complement component receptor 3, alpha; also known as CD11b (p170), macrophage antigen alpha polypeptide)); ITGAV (Integrin, alpha V (vitronectin receptor, alpha polypeptide, antigen CD51)); ITGAX (Integrin, alpha X (antigen CD11C (p150), alpha polypeptide)); ITGB1 (Integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)); ITGB2 (Integrin, beta 2 (antigen CD18 (p95), lymphocyte function-associated antigen 1; macrophage antigen 1 (mac-1) beta subunit)); ITGB3 (Integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)); ITGB4 (Integrin, beta 4); ITGB4BP (Integrin beta 4 binding protein); ITGB5 (Integrin, beta 5); ITGB6 (Integrin, beta 6); ITGB7 (Integrin, beta 7);

ITIH1 (Inter-alpha (globulin) inhibitor, H1 polypeptide); ITIH4 (Inter-alpha (globulin) inhibitor H4 (plasma Kallikrein-sensitive glycoprotein)); ITK (IL2-inducible T-cell kinase); IVL (Involucrin); JAK1 (Janus kinase 1 (a protein tyrosine kinase)); JAK2 (Janus kinase 2 (a protein tyrosine kinase)); JAK3 (Janus kinase 3 (a protein tyrosine kinase, leukocyte)); JPD (Juvenile periodontitis); JUP (Junction plakoglobin); KAL1 (Kallmann syndrome 1 sequence); KARS (Lysyl-tRNA synthetase); KCNA1 (Potassium voltage-gated channel, shaker-related subfamily, member 1 (episodic ataxia with myokymia)); KCNA2 (Potassium voltage-gated channel, shaker-related subfamily, member 2); KCNA3 (Potassium voltage-gated channel, shaker-related subfamily, member 3); KCNA5 (Potassium voltage-gated channel, shaker-related subfamily, member 5); KCNE1 (Potassium voltage-gated channel, Isk-related family, member 1); KCNJ12 (Potassium inwardly-rectifying channel, subfamily J, member 12); KCNJ3 (Potassium inwardly-rectifying channel, subfamily J, member 3); KCNQ1 (Potassium voltage-gated channel, KQT-like subfamily, member 1); KCNQ2 (Potassium voltage-gated channel, KQT-like subfamily, member 2); KDR (Kinase insert domain receptor (a type III receptor tyrosine kinase)); KEL (Kell blood group); KHK (Ketoheokinase (fructokinase)); KIR2DL4 (Killer cell immunoglobulin-like receptor, two domains, long cytoplasmic tail, 4); KIT (V-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog); KLKB1 (Kallikrein B plasma, (Fletcher factor) 1); KLRC2 (Killer cell lectin-like receptor subfamily C, member 2); KLRC3 (Killer cell lectin-like receptor subfamily C, member 3); KLRC4 (Killer cell lectin-like receptor subfamily C, member 4); KLRD1 (Killer cell lectin-like receptor subfamily D, member 1); KNG (Kininogen); KPNA1 (Karyopherin alpha 1 (importin alpha 5)); KRAS2 (V-Ki-ras2 Kirsten rat sarcoma 2 viral oncogene homolog); KRT4 (Keratin 4); KRT9 (Keratin 9 (epidermolytic palmoplantar keratoderma)); KRTHA4 (Keratin, hair, acidic, 4); KRTHB4 (Keratin, hair, basic, 4); KSR (Kinase suppressor of ras); L1CAM (L1 cell adhesion molecule (hydrocephalus, stenosis of aqueduct of Sylvius 1, MASA (mental retardation, aphasia, shuffling gait and adducted thumbs) syndrome, spastic paraplegia 1)); LAG3 (Lymphocyte-activation gene 3); LAG5 (Leukocyte antigen group 5); LAKL (Lymphokine-activated killer cell ligand); LALBA (Lactalbumin, alpha-); LAMA3 (Laminin, alpha 3 (nicein (150kD), kalinin (165kD), BM600 (150kD), epilegrin)); LAMC1 (Laminin, gamma 1 (formerly LAMB2)); LAMP2 (Lysosomal-associated membrane protein 2); LAMR1 (Laminin receptor 1 (67kD); Ribosomal protein SA); LBP (Lipopolysaccharide-binding protein); LCK (Lymphocyte-specific protein tyrosine kinase); LCN1 (Lipocalin 1 (protein migrating faster than albumin, tear prealbumin)); LCN2 (Lipocalin 2 (oncogene 24p33)); LCP1 (Lymphocyte cytosolic protein 1 (L-plastin)); LCP2 (Lymphocyte cytosolic protein 2 (SH2 domain-containing leukocyte protein of 76kD)); LDHA (Lactate dehydrogenase A); LDLR (Low density lipoprotein receptor (familia X02152); LDLR (Low density lipoprotein receptor (familial hypercholesterolemia)); LECT2 (Leukocyte cell-derived chemotaxin 2); LEP (Leptin (murine obesity homolog)); LEPR (Leptin receptor); LGALS1 (Lectin, galactoside-binding, soluble, 1 (galectin 1)); LGALS3 (Lectin, galactoside-binding, soluble, 3 (galectin 3)); LGALS3BP (Lectin, galactoside-binding, soluble, 3 binding protein (galectin 6 binding protein)); LGALS9 (Lectin, galactoside-binding, soluble, 9 (galectin 9)); LHB (Luteinizing hormone beta polypeptide); LHCGR (Luteinizing hormone/choriogonadotropin receptor); LIF (Leukemia inhibitory factor (cholinergic differentiation factor)); LIFR (Leukemia inhibitory factor receptor); LIFR (Leukemia inhibitory factor receptor); LIG1 (Ligase I, DNA, ATP-dependent); LKN-1 (Chemokine CC-2); LMAN1 (Lectin, mannose-binding, 1); LMO4 (LIM domain only 4); LNPEP (Leucyl/cystinyl aminopeptidase); LOX (Lysyl oxidase); LPA (Lipoprotein, Lp(a)); LPL (Lipoprotein lipase); LQT2 (Long (electrocardiographic) QT syndrome 2); LRP1 (Low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor)); LRP2 (Low density lipoprotein-related protein 2); LSL (Leptin, serum levels of); LSP1 (Lymphocyte-specific protein 1); LTA (Lymphotoxin alpha (TNF superfamily, member 1)); LTB4R (Leukotriene b4 receptor (chemokine receptor-like 1)); LTB4R (Leukotriene b4 receptor (chemokine receptor-like 1)); LTC4S (Leukotriene C4 synthase); LTF (Lactotransferrin); LTK (Leukocyte tyrosine kinase); LU (Lutheran blood group (Auberger b antigen included)); LY64 (Lymphocyte antigen 64 (mouse) homolog, radioprotective, 105kD); LY9 (Lymphocyte antigen 9); LYN (V-yes-1 Yamaguchi sarcoma viral related oncogene homolog); LYZ (Lysozyme (renal amyloidosis)); M1S1 (Membrane component, chromosome 1, surface marker 1 (40kD glycoprotein, identified by monoclonal antibody GA733)); MAB21L1 (Mab-21 (C. elegans)-like 1); MACAM1 (Mucosal addressin cell adhesion molecule-1); MADH1 (MAD (mothers against decapentaplegic, Drosophila) homolog 1); MADH2 (MAD (mothers against decapentaplegic, Drosophila) homolog 2); MADH4 (MAD (mothers against decapentaplegic, Drosophila) homolog 4); MAGEA1 (Melanoma antigen, family A, 1 (directs expression of antigen MZ2-E)); MAGEB1 (Melanoma antigen, family B, 1); MAL (Mal, T-cell differentiation protein); MALL (Mal, T-cell differentiation protein-like); MANB (Mannosidase, alpha B, lysosomal); MAP1B (Microtubule-associated protein 1B); MAPKAPK3 (Mitogen-activated protein kinase-activated protein kinase 3); MASP1 (Mannan-binding lectin serine protease 1 (C4/C2 activating component of Ra-reactive factor)); MAT2A (Methionine adenosyltransferase II, alpha); MATN1 (Matrilin 1, cartilage matrix protein); MATN3 (Matrilin 3); MBL2 (Mannose-binding lectin (protein C) 2, soluble (opsonic defect)); MC1R (Melanocortin 1 receptor (alpha melanocyte stimulating hormone receptor)); MC2R (Melanocortin 2 receptor (adrenocorticotrophic hormone)); MCC (Mutated in colorectal cancers); MCF2 (MCF.2 cell line derived transforming sequence); MCP (Membrane cofactor protein (CD46, trophoblast-lymphocyte cross-reactive antigen)); MDF1 (Antigen identified by monoclonal antibody A-3A4); MDH2 (Malate dehydrogenase 2, NAD (mitochondrial)); MDU1 (Antigen identified by monoclonal antibodies 4F2,

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TRA1.10, TROP4, and T43); ME1 (Malic enzyme 1, soluble); ME2 (Malic enzyme 2, mitochondrial); MEKK1 (MAP/ERK kinase kinase 1); MEKK3 (MAP/ERK kinase kinase 3); MEMO1 (Methylation modifier for class I HLA); MEN1 (Multiple endocrine neoplasia I); MEP1A (Meprin A, alpha (PABA peptide hydrolase)); MER2 (Antigen identified by monoclonal antibodies 1D12, 2F7); MFAP2 (Microfibrillar-associated protein 2); MFAP4 (Microfibrillar-associated protein 4); MFTS (Migraine, familial typical, susceptibility to); MGCT (MGI); MGP (Matrix Gla protein); MHC2TA (MHC class II transactivator); MIC2 (Antigen identified by monoclonal antibodies 12E7, F21 and O13); MIC5 (Antigen identified by monoclonal antibody R1); MIC7 (Antigen identified by monoclonal antibody 28.3.7); MICA (MHC class I polypeptide-related sequence A); MIF (Macrophage migration inhibitory factor (glycosylation-inhibiting factor)); MIG (Monokine induced by gamma interferon); MIR-10 (Leukocyte immunoglobulin-like receptor); MITF (Microphthalmia-associated transcription factor); MLLT2 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 2); MLN (Motilin); MLR (Mineralocorticoid receptor (aldosterone receptor)); MMP12 (Matrix metalloproteinase 12 (macrophage elastase)); MMP13 (Matrix metalloproteinase 13 (collagenase 3)); MMP14 (Matrix metalloproteinase 14 (membrane-inserted)); MMP15 (Matrix metalloproteinase 15 (membrane-inserted)); MMP16 (Matrix metalloproteinase 16 (membrane-inserted)); MMP17 (Matrix metalloproteinase 17 (membrane-inserted)); MMP18 (Matrix metalloproteinase 18); MMP19 (Matrix metalloproteinase 19); MMP2 (Matrix metalloproteinase 2 (gelatinase A, 72kD gelatinase, 72kD type IV collagenase)); MMP20 (Matrix metalloproteinase 20); MMP21 (Matrix metalloproteinase 21); MMP3 (Matrix metalloproteinase 3 (stromelysin 1, progelatinase)); MMP7 (Matrix metalloproteinase 7 (matrilysin, uterine)); MMP8 (Matrix metalloproteinase 8 (neutrophil collagenase)); MMP9 (Matrix metalloproteinase 9 (gelatinase B, 92kD gelatinase, 92kD type IV collagenase)); MNG1 (Multinodular goitre 1); MOG (Myelin oligodendrocyte glycoprotein); MPL (Myeloproliferative leukemia virus oncogene); MPO (Myeloperoxidase); MRBC (Monkey RBC receptor); MRC1 (Mannose receptor, C type 1); MRX20 (Mental retardation, X-linked 20); MSH3 (MutS (E. coli) homolog 3); MSLR1 (Macrophage scavenger receptor-like 1); MSR1 (Macrophage scavenger receptor 1); MSS (Marinesco-Sjogren syndrome); MSSE (Multiple self-healing squamous epithelioma); MST1 (Macrophage stimulating 1 (hepatocyte growth factor-like)); MST1R (Macrophage stimulating 1 receptor (c-met-related tyrosine kinase)); MSX2 (Msh (Drosophila) homeo box homolog 2); MTCO1 (Cytochrome c oxidase I); MTHFD (5,10-methylenetetrahydrofolate dehydrogenase, 5,10-methylenetetrahydrofolate cyclohydrolase, 10-formyltetrahydrofolate synthetase); MTHFR (5,10-methylenetetrahydrofolate reductase (NADPH)); MTND2 (NADH dehydrogenase 2); MTP (Microsomal triglyceride transfer protein (large polypeptide, 88kD)); MTR (5-methyltetrahydrofolate-homocysteine methyltransferase); MTRR (5-methyltetrahydrofolate-homocysteine methyltransferase reductase); MUC1 (Mucin 1, transmembrane); MUC2 (Mucin 2, intestinal/tracheal); MUC4 (Mucin 4, tracheobronchial); MUL (Mulibrey nanism); MUT (Methylmalonyl Coenzyme A mutase); MX1 (Myxovirus (influenza) resistance 1, homolog of murine (interferon-inducible protein p78)); MXI1 (MAX-interacting protein 1); MYB (V-myb avian myeloblastosis viral oncogene homolog); MYBPC3 (Myosin-binding protein C, cardiac); MYC (V-myc avian myelocytomatosis viral oncogene homolog); MYCL1 (V-myc avian myelocytomatosis viral oncogene homolog 1, lung carcinoma derived); MYD88 (Myeloid differentiation primary response gene (88)); MYF5 (Myogenic factor 5); MYF6 (Myogenic factor 6 (herculin)); MYO5A (Myosin VA (heavy polypeptide 12, myosin)); MYO9B (Myosin IXB); NAB1 (NGFI-A binding protein 1 (ERG1 binding protein 1)); NAGA (N-acetylgalactosaminidase, alpha-); NAIP (Neuronal apoptosis inhibitory protein); NAPA (N-ethylmaleimide-sensitive factor attachment protein, alpha); NAPB; NAGP (N-ethylmaleimide-sensitive factor attachment protein, gamma); NAT1 (N-acetyltransferase 1 (arylamine N-acetyltransferase)); NAT2 (N-acetyltransferase 2 (arylamine N-acetyltransferase)); NB (Neuroblastoma (neuroblastoma suppressor)); NCAM1 (Neural cell adhesion molecule 1); NCF1 (Neutrophil cytosolic factor 1 (47kD, chronic granulomatous disease, autosomal 1)); NCF2 (Neutrophil cytosolic factor 2 (65kD, chronic granulomatous disease, autosomal 2)); NCF4 (Neutrophil cytosolic factor 4 (40kD)); NDP (Norrie disease (pseudoglioma)); NDUFS2 (NADH dehydrogenase (ubiquinone) Fe-S protein 2 (49kD) (NADH-coenzyme Q reductase)); NEB (Nebulin); NEU (Neuraminidase); NF1 (Neurofibromin 1 (neurofibromatosis, von Recklinghausen disease, Watson disease)); NF2 (Neurofibromin 2 (bilateral acoustic neuroma)); NFATC1 (Nuclear factor of activated T-cells, cytoplasmic 1); NFATC3 (Nuclear factor of activated T-cells, cytoplasmic 3); NFATC4 (Nuclear factor of activated T-cells, cytoplasmic 4); NFE2 (Nuclear factor (erythroid-derived 2), 45kD); NFE2L2 (Nuclear factor (erythroid-derived 2)-like 2); NFIL3 (Nuclear factor, interleukin 3 regulated); NFKB1 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)); NFKB2 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)); NFKBIA (Nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha); NFRKB (Nuclear factor related to kappa B binding protein); NFYA (Nuclear transcription factor Y, alpha); NGFB (Nerve growth factor, beta polypeptide); NKS1 (Natural killer cell susceptibility 1); NM (Neutrophil migration); NME1 (Non-metastatic cells 1, protein (NM23A) expressed in); NMOR2 (NAD(P)H menadione oxidoreductase 2, dioxin-inducible); NNMT (Nicotinamide N-methyltransferase); NOS1 (Nitric oxide synthase 1 (neuronal)); NOS2A (Nitric oxide synthase 2A (inducible, hepatocytes)); NOS2B (Nitric oxide synthase 2B); NOS2C (Nitric oxide synthase 2C); NOS3 (Nitric oxide synthase 3 (endothelial cell)); NOTCH1 (Notch (Drosophila) homolog 1 (translocation-associated)); NOTCH4 (Notch (Drosophila) homolog 4); NP (Nucleoside phosphorylase); NPC1 (Niemann-Pick

disease, type C1); NPHP1 (Nephronophthisis 1 (juvenile)); NPY1R (Neuropeptide Y receptor Y1); NRAMP1 (Natural resistance-associated macrophage protein 1 (might include Leishmaniasis)); NRAMP2 (Natural resistance-associated macrophage protein 2); NRAS (Neuroblastoma RAS viral (v-ras) oncogene homolog); NRL (Neural retina leucine zipper); NT5 (5' nucleotidase (CD73)); NTF3 (Neurotrophin 3); NUCB1 (Nucleobindin 1); NUMA1 (Nuclear mitotic apparatus protein 1); NURR1 (Nuclear receptor related 1 (transcriptionally inducible)); OAI (Ocular albinism 1 (Nettleship-Falls)); OAS1 (2',5'-oligoadenylate synthetase 1); OAS2 (2'-5'oligoadenylate synthetase 2); OAT (Ornithine aminotransferase (gyrate atrophy)); OCRL (Oculocerebrorenal syndrome of Lowe); ODC1 (Ornithine decarboxylase 1); OGG1 (8-oxoguanine DNA glycosylase); OLFR2 (Olfactory receptor 2); OMG (Oligodendrocyte myelin glycoprotein); OPA1 (Optic atrophy 1 (autosomal dominant)); OPA3 (Iraqi-Jewish optic atrophy plus (3-methylglutaconicaciduria type 3)); OPLD); OPRM1 (Opioid receptor, mu 1); OPTA2 (Osteopetrosis, autosomal dominant, type II); OPTB (Osteopetrosis, autosomal recessive); OR1D2 (Olfactory receptor, family 1, subfamily D, member 2); ORCTL2 (Beckwith-Wiedemann syndrome chromosome region 1, candidate A; Organic cation transporter-like 2; Imprinted polyspecific membrane transporter 1); ORM1 (Orosomucoid 1); ORM2 (Orosomucoid 2); OSM (Oncostatin M); OTC (Ornithine carbamoyltransferase); OXT (Oxytocin, prepro- (neurophysin I)); P (P blood group globoside); P1 (P blood group (P one antigen)); P2RX1 (Purinergic receptor P2X, ligand-gated ion channel, 1); P2RY1 (Purinergic receptor P2Y, G-protein coupled, 1); PA2G4 (Proliferation-associated 2G4, 38kD); PAC1 (Prostate adenocarcinoma-1); PACE (Paired basic amino acid cleaving enzyme (furin, membrane associated receptor protein)); PAEP (Progesterone-associated endometrial protein (placental protein 14, pregnancy-associated endometrial alpha-2-globulin, alpha uterine protein)); PAFAH (Platelet-activating factor acetylhydrolase); PAFAH1B1 (Platelet-activating factor acetylhydrolase, isoform Ib, alpha subunit (45kD)); PAFAH1B2 (Platelet-activating factor acetylhydrolase, isoform Ib, beta subunit (30kD)); PAFAH2 (Platelet-activating factor acetylhydrolase 2 (40kD)); PAH (Phenylalanine hydroxylase); PAI1 (Plasminogen activator inhibitor, type I); PAPP (Pregnancy-associated plasma protein A); PAR4 (Protease-activated receptor-4 PAWR); PRKC, apoptosis, WT1, regulator); PAX2 (Paired box gene 2); PAX3 (Paired box gene 3 (Wardenburg syndrome 1)); PAX8 (Paired box gene 8); PCBD (6-pyruvoyl-tetrahydropterin synthase/dimerization cofactor of hepatocyte nuclear factor 1 alpha (TCF1)); PCCA (Propionyl Coenzyme A carboxylase, alpha polypeptide); PCCB (Propionyl Coenzyme A carboxylase, beta polypeptide); PCI (Protein C inhibitor (plasminogen activator inhibitor III)); PCK1 (Phosphoenolpyruvate carboxykinase 1 (soluble)); PCMI (Pericentriolar material 1); PCNT (Pericentrin); PCTK1 (PCTAIRE protein kinase 1); PCYT2 (Phosphate cytidylyltransferase 2, ethanolamine); PDB2); PDCD2 (Programmed cell death 2); PDE3B (Phosphodiesterase 3B, cGMP-inhibited); PDE4A (Phosphodiesterase 4A, cAMP-specific (dunce (Drosophila)-homolog phosphodiesterase E2)); PDE4B (Phosphodiesterase 4B, cAMP-specific (dunce (Drosophila)-homolog phosphodiesterase E4)); PDE7A (Phosphodiesterase 7A); PDES1B (Phosphodiesterase IB); PDGFA (Platelet-derived growth factor alpha polypeptide); PDGFB (Platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)); PDGFRA (Platelet-derived growth factor receptor, alpha polypeptide); PDGFRB (Platelet-derived growth factor receptor, beta polypeptide); PDHA1 (Pyruvate dehydrogenase (lipoamide) alpha 1); PDX1 (Pyruvate dehydrogenase complex, lipoyl-containing component X; E3-binding protein); PECAM1 (Platelet/endothelial cell adhesion molecule (CD31 antigen)); PEPC (Peptidase C); PEPD (Peptidase D); PEX10 (Peroxisome biogenesis factor 10); PF4 (Platelet factor 4); PF4V1 (Platelet factor 4 variant 1); PFBI (Plasmodium falciparum blood infection levels); PFC (Properdin P factor, complement); PFKL (Phosphofructokinase, liver); PFKM (Phosphofructokinase, muscle); PFKP (Phosphofructokinase, platelet); PFN1 (Profilin 1); PGA3 (Pepsinogen 3, group I (pepsinogen A)); PGC (Progastricsin (pepsinogen C)); PGD (Phosphogluconate dehydrogenase); PGF (Placental growth factor, vascular endothelial growth factor-related protein); PGK1 (Phosphoglycerate kinase 1); PGK2 (Phosphoglycerate kinase 2); PGL1 (Paraganglioma or familial glomus tumors 1); PGM1 (Phosphoglucomutase 1); PGM3 (Phosphoglucomutase 3); PGP (Phosphoglycolate phosphatase); PGY1 (P glycoprotein 1/multiple drug resistance 1); PHAP1 (Putative human HLA class II associated protein I); PHB (Prohibitin); PI (Protease inhibitor 1 (anti-elastase, alpha-1-antitrypsin)); PI3 (Protease inhibitor 3, skin-derived (SKALP)); PI6 (Protease inhibitor 6 (placental thrombin inhibitor)); PI8 (Protease inhibitor 8 (ovalbumin type)); PI9 (Protease inhibitor 9 (ovalbumin type)); PIGA (Phosphatidylinositol glycan, class A (paroxysmal nocturnal hemoglobinuria)); PIGF (Phosphatidylinositol glycan, class F); PIGR (Polymeric immunoglobulin receptor); PIK3CA (Phosphoinositide-3-kinase, catalytic, alpha polypeptide); PIK3CB (Phosphoinositide-3-kinase, catalytic, beta polypeptide); PIK3R1 (Phosphoinositide-3-kinase, regulatory subunit, polypeptide 1 (p85 alpha)); PIL (Protease inhibitor 1 (alpha-1-antitrypsin)-like); PIN (Dynein, cytoplasmic, light polypeptide); PKLR (Pyruvate kinase, liver and RBC); PLAGL1 (Pleomorphic adenoma gene-like 1); PLAT (Plasminogen activator, tissue); PLCD1 (Phospholipase C, delta 1); PLCG1 (Phospholipase C, gamma 1 (formerly subtype 148)); PLEK (Pleckstrin); PLG (Plasminogen); PLOD (Procollagen-lysine, 2-oxoglutarate 5-dioxygenase (lysine hydroxylase, Ehlers-Danlos syndrome type VI)); PLP (Proteolipid protein (Pelizaeus-Merzbacher disease, spastic paraplegia 2, uncomplicated)); PLT1 (Primed lymphocyte test-1); PML (Promyelocytic leukemia); PMP22 (Peripheral myelin protein 22); PMS2 (Postmeiotic segregation increased (S. cerevisiae) 2); PNMT (Phenylethanolamine N-methyltransferase); PNUTL1 (Peanut (Drosophila)-like 1); POLB (Polymerase (DNA directed), beta); POMC

(Proopiomelanocortin (adrenocorticotropin/beta-lipotropin/ alpha-melanocyte stimulating hormone/beta-melanocyte stimulating hormone/ beta-endorphin)); PON1 (Paraoxonase 1); PON2 (Paraoxonase 2); PORC (Porphyria, acute; Chester type); POU2AF1 (POU domain, class 2, associating factor 1); POU5F1 (POU domain, class 5, transcription factor 1); PPBP (Pro-platelet basic protein (includes platelet basic protein, beta-thromboglobulin, connective tissue-activating peptide III, neutrophil-activating peptide-2)); PPCD (Posterior polymorphous corneal dystrophy); PPH1 (Primary pulmonary hypertension 1); PPIB (Peptidylprolyl isomerase B (cyclophilin B)); PPOX (Protoporphyrinogen oxidase); PPP1R8 (Protein phosphatase 1, regulatory (inhibitor) subunit 8); PRB1 (Proline-rich protein BstNI subfamily 1); PRB2 (Proline-rich protein BstNI subfamily 2); PRB3 (Proline-rich protein BstNI subfamily 3); PRB4 (Proline-rich protein BstNI subfamily 4); PREP (Prolyl endopeptidase); PRF1 (Perforin 1 (preforming protein)); PRG1 (Proteoglycan 1, secretory granule); PRH1 (Proline-rich protein HaeIII subfamily 1); PRH2 (Proline-rich protein HaeIII subfamily 2); PRKCQ (Protein kinase C, theta); PRKDC (Protein kinase, DNA-activated, catalytic polypeptide); PRKG1 (Protein kinase, cGMP-dependent, type I); PRKM10 (Protein kinase mitogen-activated 10 (MAP kinase)); PRKM9 (Protein kinase mitogen-activated 9 (MAP kinase)); PRL (Prolactin); PRLR (Prolactin receptor); PRNP (Prion protein (p27-30) (Creutzfeld-Jakob disease, Gerstmann-Strausler-Scheinker syndrome, fatal familial insomnia)); PROC (Protein C (inactivator of coagulation factors Va and VIIIa)); PROP1 (Prophet of Pit1, paired-like homeodomain transcription factor); PROS1 (Protein S (alpha)); PRPH (Peripherin); PRSS1 (Protease, serine, 1 (trypsin 1)); PRSS2 (Protease, serine, 2 (trypsin 2)); PRSS7 (Protease, serine, 7 (enterokinase)); PRSS8 (Protease, serine, 8 (prostasin)); PRTN3 (Proteinase 3 (serine proteinase, neutrophil, Wegener granulomatosis autoantigen)); PSAP (Prosaposin (variant Gaucher disease and variant metachromatic leukodystrophy)); PSD (Pleckstrin and Sec7 domain protein); PSMB8 (Proteasome (prosome, macropain) subunit, beta type, 8 (large multifunctional protease 7)); PSORS1 (Psoriasis susceptibility 1); PSORS2 (Psoriasis susceptibility 2); PSORS3 (Psoriasis susceptibility 3); PTAFR (Platelet-activating factor receptor); PTC (Phenylthiocarbamide tasting); PTCH (Patched (Drosophila) homolog); PTEN (Phosphatase and tensin homolog (mutated in multiple advanced cancers 1)); PTGDS (Prostaglandin D2 synthase (21kD, brain)); PTGER3 (Prostaglandin E receptor 3 (subtype EP3)); PTGIR (Prostaglandin I2 (prostacyclin) receptor (IP)); PTGS1 (Prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and cyclooxygenase)); PTGS2 (Prostaglandin-endoperoxide synthase 2 (prostaglandin G/H synthase and cyclooxygenase)); PTK2B (Protein tyrosine kinase 2 beta); PTN (Pleiotrophin (heparin binding growth factor 8, neurite growth-promoting factor 1)); PTPN13 (Protein tyrosine phosphatase, non-receptor type 13 (APO-1/CD95 (Fas)-associated phosphatase)); PTPN6 (Protein tyrosine phosphatase, non-receptor type 6); PTPRC (Protein tyrosine phosphatase, receptor type, c polypeptide); PTPRCAP (Protein tyrosine phosphatase, receptor type, c polypeptide-associated protein); PTPRD (Protein tyrosine phosphatase, receptor type, D); PTPRF (Protein tyrosine phosphatase, receptor type, F); PTPRG (Protein tyrosine phosphatase, receptor type, gamma polypeptide); PTX3 (Pentaxin-related gene, rapidly induced by IL-1 beta PUJO); PVR (Poliovirus receptor); PVRL1 (Poliovirus receptor-like 1); PVRL2 (Poliovirus receptor-like 2); PXE (Pseudoxanthoma elasticum); PXMP1 (Peroxisomal membrane protein 1 (70kD, Zellweger syndrome)); PXN (Paxillin); PYCR1 (Pyrroline-5-carboxylate reductase 1); PYGM (Phosphorylase, glycogen; muscle (McArdle syndrome, glycogen storage disease type V)); QDPR (Quinoid dihydropteridine reductase); RAC2 (Ras-related C3 botulinum toxin substrate 2 (rho family, small GTP binding protein Rac2)); RAC3 (Ras-related C3 botulinum toxin substrate 3 (rho family, small GTP binding protein Rac3)); RAD17 (RAD17 (S. pombe) homolog); RAD51L3 (RAD51 (S. cerevisiae)-like 3); RAF1 (V-raf-1 murine leukemia viral oncogene homolog 1); RAG1 (Recombination activating gene 1); RAG2 (Recombination activating gene 2); RANBP3 (RAN binding protein 3); RAP1A (RAP1A, member of RAS oncogene family); RB1 (Retinoblastoma 1 (including osteosarcoma)); RBP4 (Retinol-binding protein 4, interstitial); RBS (Roberts syndrome); RCN2 (Reticulocalbin 2, EF-hand calcium binding domain); RCP (Red cone pigment (color blindness, protan)); RCV1 (Recoverin); RDBP (RD RNA-binding protein); RDS (Retinal degeneration, slow (retinitis pigmentosa 7)); RELA (V-rel avian reticuloendotheliosis viral oncogene homolog A (nuclear factor of kappa light polypeptide gene enhancer in B-cells 3 (p65))); REN (Renin); RENBP (Renin-binding protein); REQ (Requiem, apoptosis response zinc finger gene); RFX1 (Regulatory factor X, 1 (influences HLA class II expression)); RFX2 (Regulatory factor X, 2 (influences HLA class II expression)); RFX3 (Regulatory factor X, 3 (influences HLA class II expression)); RFX4 (Regulatory factor X, 4 (influences HLA class II expression)); RFX5 (Regulatory factor X, 5 (influences HLA class II expression)); RFXAP (Regulatory factor X-associated protein); RGS2 (Regulator of G-protein signalling 2, 24kD); RHCE (Rhesus blood group, CcEe antigens); RHD (Rhesus blood group, D antigen); RHO (Rhodopsin (retinitis pigmentosa 4, autosomal dominant)); RMSA1 (Regulator of mitotic spindle assembly 1); RN5S1@ (RNA, 5S cluster 1); RNR1 (RNA, ribosomal 1); RNU1A (RNA, U1A small nuclear); RNU2 (RNA, U2 small nuclear); ROM1 (Retinal outer segment membrane protein 1); RP2 (Retinitis pigmentosa 2 (X-linked recessive)); RPE65 (Retinal pigment epithelium-specific protein (65kD)); RPL7A (Ribosomal protein L7a); RPS4X (Ribosomal protein S4, X-linked); RRAD (Ras-related associated with diabetes); RRM1 (Ribonucleotide reductase M1 polypeptide); RSN (Restin (Reed-Steinberg cell-expressed intermediate filament-associated protein)); RTS (Rothmund-Thomson syndrome); RXRB (Retinoid X receptor, beta); RYR1 (Ryanodine receptor 1 (skeletal)); S100A4 (S100 calcium-binding protein A4 (calcium protein, calvasculin, metastasin, murine placental homolog)); S100A7 (S100 calcium-binding protein A7 (psoriasin 1)); S100A8 (S100 calcium-binding

protein A8 (calgranulin A)); SAA1 (Serum amyloid A1); SAG (S-antigen; retina and pineal gland (arrestin)); SARI (RasGAP-like with IQ motifs); SCLC1; SCN1B (Sodium channel, voltage-gated, type I, beta polypeptide); SCN4A (Sodium channel, voltage-gated, type IV, alpha polypeptide); SCN5A (Sodium channel, voltage-gated, type V, alpha polypeptide (long (electrocardiographic) QT syndrome 3)); SCNN1G (Sodium channel, nonvoltage-gated 1, gamma); SCYA1 (Small inducible cytokine subfamily A (Cys-Cys), member 11 (eotaxin)); SCYA13 (Small inducible cytokine subfamily A (Cys-Cys), member 13); SCYA14 (Small inducible cytokine subfamily A (Cys-Cys), member 14); SCYA15 (Small inducible cytokine subfamily A (Cys-Cys), member 15); SCYA16 (Small inducible cytokine subfamily A (Cys-Cys), member 16); SCYA17 (Small inducible cytokine subfamily A (Cys-Cys), member 17); SCYA18 (Small inducible cytokine subfamily A (Cys-Cys), member 18, pulmonary and activation-regulated); SCYA19 (Small inducible cytokine subfamily A (Cys-Cys), member 19); SCYA2 (Small inducible cytokine A2 (monocyte chemotactic protein 1, homologous to mouse Sig-je)); SCYA20 (Small inducible cytokine subfamily A (Cys-Cys), member 20); SCYA21 (Small inducible cytokine subfamily A (Cys-Cys), member 21); SCYA22 (Small inducible cytokine subfamily A (Cys-Cys), member 22); SCYA23 (Small inducible cytokine subfamily A (Cys-Cys), member 23); SCYA24 (Small inducible cytokine subfamily A (Cys-Cys), member 24); SCYA25 (Small inducible cytokine subfamily A (Cys-Cys), member 25); SCYA3 (Small inducible cytokine A3 (homologous to mouse Mip-1a)); SCYA3L1 (Small inducible cytokine A3-like 1); SCYA4 (Small inducible cytokine A4 (homologous to mouse Mip-1b)); SCYA5 (Small inducible cytokine A5 (RANTES)); SCYA7 (Small inducible cytokine A7 (monocyte chemotactic protein 3)); SCYA8 (Small inducible cytokine subfamily A (Cys-Cys), member 8 (monocyte chemotactic protein 2)); SCYB5 (Small inducible cytokine subfamily B (Cys-X-Cys), member 5 (epithelial-derived neutrophil-activating peptide 78)); SCYB6 (Small inducible cytokine subfamily B (Cys-X-Cys), member 6 (granulocyte chemotactic protein 2)); SCYC1 (Small inducible cytokine subfamily C, member 1 (lymphotactin)); SCYD1 (Small inducible cytokine subfamily D (Cys-X3-Cys), member 1 (fractalkine, neurotactin)); SDF1 (Stromal cell-derived factor 1); SDHC (Succinate dehydrogenase complex, subunit C, integral membrane protein, 15kD); SELE (Selectin E (endothelial adhesion molecule 1)); SELL (Selectin L (lymphocyte adhesion molecule 1)); SELP (Selectin P (granule membrane protein 140kD, antigen CD62)); SELPLG (Selectin P ligand); SERK1 (SAPK/Erk kinase 1); SF (Stoltzfus blood group); SFTPA1 (Surfactant, pulmonary-associated protein A1); SFTPA2 (Surfactant, pulmonary-associated protein A2); SFTPB (Surfactant, pulmonary-associated protein B); SFTPD (Surfactant, pulmonary-associated protein D); SGCN (Sarcoglycan, beta (43kD dystrophin-associated glycoprotein)); SGCD (Sarcoglycan, delta (35kD dystrophin-associated glycoprotein)); SGSH (N-sulfoglucosamine sulfohydrolase (sulfamidase)); SH2D1A (SH2 domain protein 1A, Duncan's disease (lymphoproliferative syndrome)); SHH (Sonic hedgehog (Drosophila) homolog); SHMT2 (Serine hydroxymethyltransferase 2 (mitochondrial)); SHOX (Short stature homeobox); SIAH1 (Seven in absentia (Drosophila) homolog 1); SIPA1 (Signal-induced proliferation-associated gene 1); SKIV2L (Superkiller viralicidic activity 2 (S. cerevisiae homolog)-like); SLC12A1 (Solute carrier family 12 (sodium/potassium/chloride transporters), member 1); SLC14A1 (Solute carrier family 14 (urea transporter), member 1 (Kidd blood group)); SLC18A2 (Solute carrier family 18 (vesicular monoamine), member 2); SLC1A5 (Solute carrier family 1 (neutral amino acid transporter), member 5); SLC20A1 (Solute carrier family 20 (phosphate transporter), member 1); SLC20A2 (Solute carrier family 20 (phosphate transporter), member 2); SLC2A1 (Solute carrier family 2 (facilitated glucose transporter), member 1); SLC2A2 (Solute carrier family 2 (facilitated glucose transporter), member 2); SLC2A4 (Solute carrier family 2 (facilitated glucose transporter), member 4); SLC3A1 (Solute carrier family 3 (cystine, dibasic and neutral amino acid transporters, activator of cystine, dibasic and neutral amino acid transport), member 1); SLC4A1 (Solute carrier family 4, anion exchanger, member 1 (erythrocyte membrane protein band 3, Diego blood group)); SLC5A5 (Solute carrier family 5 (sodium iodide symporter), member 5); SLC6A2 (Solute carrier family 6 (neurotransmitter transporter, noradrenalin), member 2); SLC6A3 (Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3); SLC6A4 (Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4); SLC7A7 (Solute carrier family 7 (cationic amino acid transporter, y+ system), member 7); SLC9A1 (Solute carrier family 9 (sodium/hydrogen exchanger), isoform 1 (antiporter, Na+/H+, amiloride sensitive)); SLEB1 (Systemic lupus erythematosus susceptibility 1); SLP1 (Secretory leukocyte protease inhibitor (antileukoproteinase)); SM1 (Schistosoma mansoni, susceptibility/resistance to); SMN1 (Survival of motor neuron 1, telomeric); SNAP23 (Synaptosomal-associated protein, 23kD); SNCG (Synuclein, gamma (breast cancer-specific protein 1)); SNRP70 (Small nuclear ribonucleoprotein 70kD polypeptide (RNP antigen)); SNRPB (Small nuclear ribonucleoprotein polypeptides B and B1); SNRPN (Small nuclear ribonucleoprotein polypeptide N); SOAT1 (Sterol O-acyltransferase (acyl-Coenzyme A: cholesterol acyltransferase) 1); SOD1 (Superoxide dismutase 1, soluble (amyotrophic lateral sclerosis 1 (adult))); SOD2 (Superoxide dismutase 2, mitochondrial); SORL1 (Sortilin-related receptor, L(DLR class) A repeats-containing); SOX10 (SRY (sex-determining region Y)-box 10); SOX4 (SRY (sex determining region Y)-box 4); SPG3A (Spastic paraplegia 3A (autosomal dominant)); SPN (Sialophorin (gpL115, leukosialin, CD43)); SPN (Sialophorin (gpL115, leukosialin, CD43)); SPP1 (Secreted phosphoprotein 1 (osteopontin, bone sialoprotein I, early T-lymphocyte activation 1)); SPTA1 (Spectrin, alpha, erythrocytic 1 (elliptocytosis 2)); SRD5A2 (Steroid-5-alpha-reductase, alpha polypeptide 2 (3-oxo-5 alpha-steroid delta 4-dehydrogenase alpha 2)); SSA2 (Sjogren syndrome antigen A2

(60kD, ribonucleoprotein autoantigen SS-A/Ro)); SSB (Sjogren syndrome antigen B (autoantigen La)); SSTR1 (Somatostatin receptor 1); ST3 (Suppression of tumorigenicity 3); STAM (Signal transducing adaptor molecule (SH3 domain and ITAM motif) 1); STAT1 (Signal transducer and activator of transcription 1, 91kD); STAT2 (Signal transducer and activator of transcription 2, 113kD); STAT3 (Signal transducer and activator of transcription 3 (acute-phase response factor)); STAT4 (Signal transducer and activator of transcription 4); STAT5A (Signal transducer and activator of transcription 5A); STAT6 (Signal transducer and activator of transcription 6, interleukin-4 induced); STATH (Statherin); STATI2 (STAT induced STAT inhibitor-2); STX1B (Syntaxin 1B); SULT1A1 (Sulfotransferase family 1A, phenol-preferring, member 1); SULT1A3 (Sulfotransferase family 1A, phenol-preferring, member 3); SULT2A1 (Sulfotransferase family 2A, dehydroepiandrosterone (DHEA) -preferring, member 1); SUOX (Sulfite oxidase); SUR (Sulfonylurea receptor (hyperinsulinemia)); SURF1 (Surfeit 1); SW (Swann blood group); T (T brachyury (mouse) homolog); TAP1 (Transporter 1, ABC (ATP binding cassette)); TAP2 (Transporter 2, ABC (ATP binding cassette)); TAT (Tyrosine aminotransferase); TAZ (Tafazzin (cardiomyopathy, dilated 3A (X-linked), endocardial fibroelastosis 2; Barth syndrome)); TBG (Thyroxine-binding globulin); TBP (TATA box binding protein); TBX2 (T-box 2); TBXA2R (Thromboxane A2 receptor); TBXAS1 (Thromboxane A synthase 1 (platelet, cytochrome P450, subfamily V)); TCF1 (Transcription factor 1, hepatic; LF-B1, hepatic nuclear factor (HNF1), albumin proximal factor); TCF19 (Transcription factor 19 (SC1)); TCF3 (Transcription factor 3 (E2A immunoglobulin enhancer binding factors E12/E47)); TCF7 (Transcription factor 7 (T-cell specific, HMG-box)); TCF8 (Transcription factor 8 (represses interleukin 2 expression)); TCL1A (T-cell leukemia/lymphoma 1A); TCL4 (T-cell leukemia/lymphoma 4); TCN1 (Transcobalamin I (vitamin B12 binding protein, R binder family)); TCN2 (Transcobalamin II; macrocytic anemia); TCP1 (T-complex 1); TCRA (T-cell receptor, alpha (V,D,J,C)); TCRB (T-cell receptor, beta cluster); TCRB (T-cell receptor, beta cluster); TCRG (T-cell receptor, gamma cluster); TCTE1 (T-complex-associated-testis-expressed 1); TDO2 (Tryptophan 2,3-dioxygenase); TECTA (Tectorin alpha); TERF2 (Telomeric repeat binding factor 2); TF (Transferrin); TFF2 (Treff factor 2 (spasmolytic protein 1)); TFPI (Tissue factor pathway inhibitor (lipoprotein-associated coagulation inhibitor)); TFPI2 (Tissue factor pathway inhibitor-2); TFR1 (Transferrin receptor (p90, CD71)); TG (Thyroglobulin); TGFB1 (Transforming growth factor, beta 1); TGFB2 (Transforming growth factor, beta 2); TGFB3 (Transforming growth factor, beta 3); TGFBI (Transforming growth factor, beta-induced, 68kD); TGFBR3 (Transforming growth factor, beta receptor III (betaglycan, 300kD)); TGM1 (Transglutaminase 1 (K polypeptide epidermal type I, protein-glutamine-gamma-glutamyltransferase)); TGM2 (Transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase)); TH (Tyrosine hydroxylase); THBS1 (Thrombospondin 1); THBS2 (Thrombospondin 2); THPO (Thrombopoietin (myeloproliferative leukemia virus oncogene ligand, megakaryocyte growth and development factor)); THRA (Thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog)); THRB (Thyroid hormone receptor, beta (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog 2)); THY1 (Thy-1 cell surface antigen); TIEG (TGFB inducible early growth response); TIMP3 (Tissue inhibitor of metalloproteinase 3 (Sorsby fundus dystrophy, pseudoinflammatory)); TK1 (Thymidine kinase 1, soluble); TKT (Transketolase (Wernicke-Korsakoff syndrome)); TLR1 (Toll-like receptor 1); TLR2 (Toll-like receptor 2); TLR3 (Toll-like receptor 3); TLR4 (Toll-like receptor 4); TLR5 (Toll-like receptor 5); TM4SF7 (Transmembrane 4 superfamily member 7); TMEM1 (Transmembrane protein 1); TNF (Tumor necrosis factor (TNF superfamily, member 2)); TNFAIP2 (Tumor necrosis factor, alpha-induced protein 2); TNFAIP6 (Tumor necrosis factor, alpha-induced protein 6); TNFRSF11B (Tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin)); TNFRSF12 (Tumor necrosis factor receptor superfamily, member 12 (translocating chain-association membrane protein)); TNFRSF14 (Tumor necrosis factor receptor superfamily, member 14 (herpesvirus entry mediator)); TNFRSF17 (Tumor necrosis factor receptor superfamily, member 17); TNFRSF1A (Tumor necrosis factor receptor superfamily, member 1A); TNFRSF1B (Tumor necrosis factor receptor superfamily, member 1B); TNFRSF5 (Tumor necrosis factor receptor superfamily, member 5); TNFRSF6 (Tumor necrosis factor receptor superfamily, member 6); TNFRSF6B (Tumor necrosis factor receptor superfamily, member 6b, decoy); TNFRSF7 (Tumor necrosis factor receptor superfamily, member 7); TNFRSF9 (Tumor necrosis factor receptor superfamily, member 9); TNFSF11 (Tumor necrosis factor (ligand) superfamily, member 11); TNFSF12 (Tumor necrosis factor (ligand) superfamily, member 12); TNFSF14 (Tumor necrosis factor (ligand) superfamily, member 14); TNFSF5 (Tumor necrosis factor (ligand) superfamily, member 5); TNFSF6 (Tumor necrosis factor (ligand) superfamily, member 6); TNNT2 (Troponin T2, cardiac); TP53 (Tumor protein p53 (Li-Fraumeni syndrome)); TP73 (Tumor protein p73); TPH (Tryptophan hydroxylase (tryptophan 5-monooxygenase)); TPI1 (Triosephosphate isomerase 1); TPM1 (Tropomyosin 1 (alpha)); TPMT (Thiopurine S-methyltransferase); TPO (Thyroid peroxidase); TPT1 (Tumor protein, translationally-controlled 1); TRAF1 (TNF receptor-associated factor 1); TRAF1 (TNF receptor-associated factor 1); TRAF2 (TNF receptor-associated factor 2); TRAF3 (TNF receptor-associated factor 3); TRAF4 (TNF receptor-associated factor 4); TRAF5 (TNF receptor-associated factor 5); TRAF6 (TNF receptor-associated factor 6); TRP1 (TRNA proline 1); TSHB (Thyroid stimulating hormone, beta); TSHR (Thyroid stimulating hormone receptor); TSSC3 (Tumor suppressing subtransferable candidate 3); TST (Thiosulfate sulfurtransferase (rhodanese)); TSTA3 (Tissue specific transplantation antigen P35B); TTIM1 (T-cell tumor invasion and metastasis 1); TTR (Transthyretin (prealbumin, amyloidosis type I)); TUB (Tubby (mouse) homolog); TUBA3

(Tubulin, alpha, brain-specific); TUBAL1 (Tubulin, alpha-like 1); TUBB (Tubulin, beta polypeptide); TWIST (Twist (*Drosophila*) homolog); TXN (Thioredoxin); U2AF1 (U2(RNU2) small nuclear RNA auxiliary factor 1 (non-standard symbol)); UBC (Ubiquitin C); UBE1 (Ubiquitin-activating enzyme E1 (A1S9T and BN75 temperature sensitivity complementing)); UBE2B (Ubiquitin-conjugating enzyme E2B (RAD6 homolog)); UBE2I (Ubiquitin-conjugating enzyme E2I (homologous to yeast UBC9)); UBE2V2 (Ubiquitin-conjugating enzyme E2 variant 2); UBE3A (Ubiquitin protein ligase E3A (human papilloma virus E6-associated protein, Angelman syndrome)); UBL1 (Ubiquitin-like 1 (sentrin)); UCP2 (Uncoupling protein 2 (mitochondrial, proton carrier)); UCP3 (Uncoupling protein 3 (mitochondrial, proton carrier)); UFS (Urofacial syndrome); UGB (Uteroglobin); UGDH (UDP-glucose dehydrogenase); UGT1 (UDP glycosyltransferase 1); UMPK (Uridine monophosphate kinase); UMPS (Uridine monophosphate synthetase (orotate phosphoribosyl transferase and); orotidine-5'-decarboxylase)); UP (Uridine phosphorylase); UPK1B (Uroplakin 1B); UROD (Uroporphyrinogen decarboxylase); UROS (Uroporphyrinogen III synthase (congenital erythropoietic porphyria)); USH2A (Usher syndrome 2A (autosomal recessive, mild)); USP7 (Ubiquitin specific protease 7 (herpes virus-associated)); VASP (Vasodilator-stimulated phosphoprotein); VCAM1 (Vascular cell adhesion molecule 1); VDAC1 (Voltage-dependent anion channel 1); VDR (Vitamin D (1,25- dihydroxyvitamin D3) receptor); VHL (Von Hippel-Lindau syndrome); VMD2 (Vitelliform macular dystrophy (Best disease, bestrophin)); VPB1 (Pre-B lymphocyte gene 1 (non-standard provisional symbol)); VPB2 (Pre-B lymphocyte-specific protein-2); VSD1 (Ventricular septal defect 1); VTN (Vitronectin (serum spreading factor, somatomedin B, complement S-protein)); VWF (Von Willebrand factor); WAS (Wiskott-Aldrich syndrome (eczema-thrombocytopenia)); WEE1 (Wee1+ (*S. pombe*) homolog); WFS (Wolfram syndrome); WT1 (Wilms tumor 1); WT3 (Wilms tumor-3); WWS (Wieacker-Wolff syndrome); XBP1 (X-box binding protein 1); XG (Xg blood group (pseudautosomal boundary-divided on the X chromosome)); XGR (Expression of XG and MIC2 on erythrocytes); XK (Kell blood group precursor (McLeod phenotype)); XPA (Xeroderma pigmentosum, complementation group A); XPC (Xeroderma pigmentosum, complementation group C); XPNPEPL (X-prolyl aminopeptidase (aminopeptidase P)-like); XRCC1 (X-ray repair complementing defective repair in Chinese hamster cells 1); XRCC2 (X-ray repair complementing defective repair in Chinese hamster cells 2); XRCC3 (X-ray repair complementing defective repair in Chinese hamster cells 3); YB1 (Major histocompatibility complex, class II, Y box-binding protein I; DNA-binding protein B); ZFP161 (Zinc finger protein homologous to Zfp161 in mouse); ZFP36 (Zinc finger protein homologous to Zfp-36 in mouse); ZFY (Zinc finger protein, Y-linked); ZNF121 (Zinc finger protein 121 (clone ZHC32)); ZRK (Zona pellucida receptor tyrosine kinase, 95kD);

Metabolism

ACAT1 (Acetyl-Coenzyme A acetyltransferase 1 (acetoacetyl Coenzyme A thiolase); ACAT2 (Acetyl-Coenzyme A acetyltransferase 2 (acetoacetyl Coenzyme A thiolase); ACATN (Acetyl-Coenzyme A transporter; BCAT1 (Branched chain aminotransferase 1, cytosolic; CRAT (Carnitine acetyltransferase; DIA4 (Diaphorase (NADH/NADPH) (cytochrome b-5 reductase); DUSP2 (Dual specificity phosphatase 2; EPHX1 (Epoxide hydrolase 1, microsomal (xenobiotic); EPHX2 (Epoxide hydrolase 2, cytoplasmic; GATM (Glycine amidinotransferase (L-arginine:glycine amidinotransferase); GJA4 (Gap junction protein, alpha 4, 37kD (connexin 37); HADHSC (L-3-hydroxyacyl-Coenzyme A dehydrogenase, short chain; HK1 (Hexokinase 1; HK3 (Hexokinase 3 (white cell); HMBS (Hydroxymethylbilane synthase; IARS (Isoleucine-tRNA synthetase; NAT1 (N-acetyltransferase 1 (arylamine N-acetyltransferase); OAT (Ornithine aminotransferase (gyrate atrophy); OTC (Ornithine carbamoyltransferase; PCCA (Propionyl Coenzyme A carboxylase, alpha polypeptide; PCCB (Propionyl Coenzyme A carboxylase, beta polypeptide; PDHA1 (Pyruvate dehydrogenase (lipoamide) alpha 1; QDPR (Quinoid dihydropteridine reductase; SGSH (N-sulfoglucosamine sulfohydrolase (sulfamidase); SHBG (Sex hormone-binding globulin; SHMT2 (Serine hydroxymethyltransferase 2 (mitochondrial); SLC7A1 (Solute carrier family 7 (cationic amino acid transporter, y+ system), member 1; SLC7A2 (Solute carrier family 7 (cationic amino acid transporter, y+ system), member 2; SLC7A4 (Solute carrier family 7 (cationic amino acid transporter, y+ system), member 4; SOAT1 (Sterol O-acyltransferase (acyl-Coenzyme A: cholesterol acyltransferase) 1; SOAT2 (Sterol O-acyltransferase 2; SORD (Sorbitol dehydrogenase; TPI1 (Triosephosphate isomerase 1; TYMS (Thymidylate synthetase; TYR (Tyrosinase (oculocutaneous albinism IA); TYRP1 (Tyrosinase-related protein 1; UGT2B17 (UDP glycosyltransferase 2 family, polypeptide B17; UGT2B7 (UDP glycosyltransferase 2 family, polypeptide B7; UGTREL1 (UDP-galactose transporter related);

Metastasis

ACTG1 (Actin, gamma 1); ADD3 (Adducin 3 (gamma)); ALCAM (Activated leucocyte cell adhesion molecule); ANK1 (Ankyrin 1, erythrocytic); ANPEP (Alanyl (membrane) aminopeptidase (aminopeptidase N, aminopeptidase M, microsomal aminopeptidase, CD13, p150)); BTN (Butyrophilin); CD14 (CD14 antigen); CD19 (CD19 antigen); CD1D (CD1D antigen, d polypeptide); CD2 (CD2 antigen (p50), sheep red blood cell receptor); CD20 (CD20 antigen); CD22 (CD22 antigen); CD33 (CD33 antigen (gp67)); CD34 (CD34 antigen); CD37 (CD37 antigen); CD38 (CD38 antigen (p45)); CD39 (CD39 antigen); CD4 (CD4 antigen (p55)); CD44 (CD44 antigen (homing function and Indian blood group system)); CD47 (CD47 antigen (Rh-related antigen, integrin-associated signal transducer)); CD48 (CD48 antigen (B-cell membrane protein)); CD53 (CD53 antigen);

CD58 (CD58 antigen, (lymphocyte function-associated antigen 3)); CD59 (CD59 antigen p18-20 (antigen identified by monoclonal antibodies 16.3A5, EJ16, EJ30, EL32 and G344)); CD63 (CD63 antigen (melanoma 1 antigen)); CD68 (CD68 antigen); CD7 (CD7 antigen (p41)); CD72 (CD72 antigen); CD8A (CD8 antigen, alpha polypeptide (p32)); CD9 (CD9 antigen (p24)); CD97 (CD97 antigen); CDH13 (Cadherin 13, H-cadherin (heart)); CDH17 (Cadherin 17, LI cadherin (liver-intestine)); CDH2 (Cadherin 2, N-cadherin (neuronal)); CDH4 (Cadherin 4, R-cadherin (retinal)); CDH5 (Cadherin 5, VE-cadherin (vascular epithelium)); CDW52 (CDW52 antigen (CAMPATH-1 antigen)); CLTB (Clathrin, light polypeptide (Lcb)); DAF (Decay accelerating factor for complement (CD55, Cromer blood group system)); DPP4 (Dipeptidylpeptidase IV (CD26, adenosine deaminase complexing protein 2)); ENG (Endoglin (Osler-Rendu-Weber syndrome 1)); F3 (Coagulation factor III (thromboplastin, tissue factor)); FAP (Fibroblast activation protein, alpha); FAT (FAT tumor suppressor (*Drosophila*) homolog); FLNA (Filamin A, alpha (actin-binding protein-280)); FN1 (Fibronectin 1); GJA4 (Gap junction protein, alpha 4, 37kD (connexin 37)); HMMR (Hyaluronan-mediated motility receptor (RHAMM)); ICAM1 (Intercellular adhesion molecule 1 (CD54), human rhinovirus receptor); ICAM2 (Intercellular adhesion molecule 2); ICAM3 (Intercellular adhesion molecule 3); ITGA2 (Integrin, alpha 2 (CD49B, alpha 2 subunit of VLA-2 receptor)); ITGA3 (Integrin, alpha 3 (antigen CD49C, alpha 3 subunit of VLA-3 receptor)); ITGA4 (Integrin, alpha 4 (antigen CD49D, alpha 4 subunit of VLA-4 receptor)); ITGA5 (Integrin, alpha 5 (fibronectin receptor, alpha polypeptide)); ITGA6 (Integrin, alpha 6); ITGA7 (Integrin, alpha 7); ITGA9 (Integrin, alpha 9); ITGAE (Integrin, alpha E (antigen CD103, human mucosal lymphocyte antigen 1; alpha polypeptide)); ITGAL (Integrin, alpha L (antigen CD11A (p180), lymphocyte function-associated antigen 1; alpha polypeptide)); ITGAM (Integrin, alpha M (complement component receptor 3, alpha; also known as CD11b (p170), macrophage antigen alpha polypeptide)); ITGAV (Integrin, alpha V (vitronectin receptor, alpha polypeptide, antigen CD51)); ITGAX (Integrin, alpha X (antigen CD11C (p150), alpha polypeptide)); ITGB1 (Integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2, MSK12)); ITGB2 (Integrin, beta 2 (antigen CD18 (p95), lymphocyte function-associated antigen 1; macrophage antigen 1 (mac-1) beta subunit)); ITGB3 (Integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)); ITGB4 (Integrin, beta 4); ITGB5 (Integrin, beta 5); ITGB7 (Integrin, beta 7); ITGB8 (Integrin, beta 8); JAG1 (Jagged1 (Alagille syndrome)); JAG2 (Jagged 2); KAI1 (Kangai 1 (suppression of tumorigenicity 6, prostate; CD82 antigen (R2 leukocyte antigen, antigen detected by monoclonal and antibody IA4)); KPNB1 (Karyopherin (importin) beta 1); LAG3 (Lymphocyte-activation gene 3); LY64 (Lymphocyte antigen 64 (mouse) homolog, radioprotective, 105kD); LYZ (Lysozyme (renal amyloidosis)); MAP1B (Microtubule-associated protein 1B); MDU1 (Antigen identified by monoclonal antibodies 4F2, TRA1.10, TROP4, and T43); MIC2 (Antigen identified by monoclonal antibodies 12E7, F21 and O13); MICA (MHC class I polypeptide-related sequence A); MME (Membrane metallo-endopeptidase (neutral endopeptidase, enkephalinase, CALLA, CD10)); MYL2 (Myosin, light polypeptide 2, regulatory, cardiac, slow); MYL3 (Myosin, light polypeptide 3, alkali; ventricular, skeletal, slow); NCAM1 (Neural cell adhesion molecule 1); NEO1 (Neogenin (chicken) homolog 1); NME3 (Non-metastatic cells 3, protein expressed in); PCDH1 (Protocadherin 1 (cadherin-like 1)); PDNPI (Phosphodiesterase I/nucleotide pyrophosphatase 1 (homologous to mouse Ly-41 antigen)); PECAM1 (Platelet/endothelial cell adhesion molecule (CD31 antigen)); PKD1 (Polycystic kidney disease 1 (autosomal dominant)); PTCH (Patched (*Drosophila*) homolog); RSN (Restin (Reed-Steinberg cell-expressed intermediate filament-associated protein)); RTN1 (Reticulon 1); SDC1 (Syndecan 1); SDC2 (Syndecan 2 (heparan sulfate proteoglycan 1, cell surface-associated, fibroglycan)); SDC4 (Syndecan 4 (amphiglycan, ryudocan)); SELE (Selectin E (endothelial adhesion molecule 1)); SELL (Selectin L (lymphocyte adhesion molecule 1)); SELP (Selectin P (granule membrane protein 140kD, antigen CD62)); SELPLG (Selectin P ligand); SIAT1 (Sialyltransferase 1 (beta-galactoside alpha-2,6-sialyltransferase)); SLAM (Signaling lymphocytic activation molecule); SPTA1 (Spectrin, alpha, erythrocytic 1 (elliptocytosis 2)); SPTB (Spectrin, beta, erythrocytic (includes sperocytosis, clinical type 1)); ST2 (Suppression of tumorigenicity 2); TBCC (Tubulin-specific chaperone c); THBS1 (Thrombospondin 1); TM4SF2 (Transmembrane 4 superfamily member 2); TM4SF3 (Transmembrane 4 superfamily member 3); TNFSF4 (Tumor necrosis factor (ligand) superfamily, member 4 (tax-transcriptionally activated glycoprotein 1, 34kD)); TNFSF5 (Tumor necrosis factor (ligand) superfamily, member 5); TNFSF7 (Tumor necrosis factor (ligand) superfamily, member 7); TTN (Titin); TUBA1 (Tubulin, alpha 1 (testis specific)); TUBG (Tubulin, gamma polypeptide); VCAM1 (Vascular cell adhesion molecule 1); VCL (Vinculin); VIM (Vimentin);

Miscellaneous

AREG (Amphiregulin (schwannoma-derived growth factor)); BCGF1 (B-cell growth factor 1 (12kD)); CTGF (Connective tissue growth factor); CTGF-L (Connective tissue growth factor-like protein); ECGF1 (Endothelial cell growth factor 1 (platelet-derived)); EGF (Epidermal growth factor); EPS15 (Epidermal growth factor receptor pathway substrate 15); EPS8 (Epidermal growth factor receptor pathway substrate 8); FGF1 (Fibroblast growth factor 1 (acidic)); FGF10 (Fibroblast growth factor 10); FGF11 (Fibroblast growth factor 11); FGF12B (Fibroblast growth factor 12B); FGF13 (Fibroblast growth factor 13); FGF14 (Fibroblast growth factor 14); FGF16 (Fibroblast growth factor 16); FGF6 (Fibroblast growth factor 6); FGF7 (Fibroblast growth factor 7 (keratinocyte growth factor)); FGF8 (Fibroblast growth factor 8 (androgen-induced)); FGF9 (Fibroblast growth factor 9 (glia-activating factor)); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2,

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Pfeiffer syndrome)); FGFR2 (Fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome, Pfeiffer syndrome, Jackson-Weiss syndrome)); FGFR3 (Fibroblast growth factor receptor 3 (achondroplasia, thanatophoric dwarfism)); FGFR4 (Fibroblast growth factor receptor 4); FIBP (Fibroblast growth factor (acidic) intracellular binding protein); FIGF (C-fos induced growth factor (vascular endothelial growth factor D)); HDGF (Hepatoma-derived growth factor (high-mobility group protein 1-like)); IGF1 (Insulin-like growth factor 1 (somatomedin C)); IGF2 (Insulin-like growth factor 2 (somatomedin A)); IGFALS (Insulin-like growth factor binding protein, acid labile subunit); NGFB (Nerve growth factor, beta polypeptide); PDGFA (Platelet-derived growth factor alpha polypeptide); PDGFRB (Platelet-derived growth factor receptor, beta polypeptide); PGF (Placental growth factor, vascular endothelial growth factor-related protein); PTN (Pleiotrophin (heparin binding growth factor 8, neurite growth-promoting factor 1)); QSCN6 (Quiescin Q6); TAK1 (Transforming growth factor beta-activated kinase 1); TIEG (TGFB inducible early growth response); TIEG2 (TGFB inducible early growth response 2); VEGF (Vascular endothelial growth factor); VEGFB (Vascular endothelial growth factor B); VGF (VGF nerve growth factor inducible); VTN (Vitronectin (serum spreading factor, somatomedin B, complement S-protein)); A2M (Alpha-2-macroglobulin); ADAM17 (A disintegrin and metalloproteinase domain 17 (tumor necrosis factor, alpha, converting enzyme)); ADSL (Adenylosuccinate lyase); AOA1 (Acyl-CoA oxidase, alpha); AOX1 (Aldehyde oxidase 1); ATP5J (ATP synthase, H⁺ transporting, mitochondrial F0 complex, subunit F6); BCAT2 (Branched chain aminotransferase 2, mitochondrial); BCKDHA (Branched chain keto acid dehydrogenase E1, alpha polypeptide (maple syrup urine disease)); BCL6 (B-cell CLL/lymphoma 6 (zinc finger protein 51)); BCL7 (B-cell CLL/lymphoma 7); BHMT (Betaine-homocysteine methyltransferase); BSG (Basigin); BTG1 (B-cell translocation gene 1, anti-proliferative); C5 (Complement component 5); CAD (Carbamoyl-phosphate synthetase 2, aspartate transcarbamylase, and dihydroorotase); CATR1 (CATR tumorigenicity conversion 1); CDR1 (Cerebellar degeneration-related protein (34kD)); CHGB (Chromogranin B (secretogranin 1)); CHIT1 (Chitinase 1); COL9A2 (Collagen, type IX, alpha 2); COX10 (Cytochrome c oxidase subunit X (heme A: farnesyltransferase)); COX11 (Cytochrome c oxidase subunit 11); COX15 (Cytochrome c oxidase subunit 15); COX17 (Human homolog of yeast mitochondrial copper recruitment gene); COX5A (Cytochrome c oxidase subunit Va); COX5B (Cytochrome c oxidase subunit Vb); COX6A1 (Cytochrome c oxidase subunit VIa polypeptide 1); COX6A2 (Cytochrome c oxidase subunit VIa polypeptide 2); COX6B (Cytochrome c oxidase subunit VIb); COX6C (Cytochrome c oxidase subunit VIc); COX7C (Cytochrome c oxidase subunit VIIc); COX7RP (Cytochrome c oxidase subunit VII-related protein); COX8 (Cytochrome c oxidase subunit VIII); CPA1 (Carboxypeptidase A1 (pancreatic)); CRHBP (Corticotropin releasing hormone-binding protein); CRIP2 (Cysteine-rich protein 2); CTH (Cystathionase (cystathionine gamma-lyase)); CTSB (Cathepsin B); CTSL (Cathepsin L); CYP (Cdk-associating RS-cyclophilin); DARS (Aspartyl-tRNA synthetase); DEFA1 (Defensin, alpha 1, myeloid-related sequence); DSCAM (Down syndrome cell adhesion molecule); DUSP2 (Dual specificity phosphatase 2); DYT1 (Dystonia 1, torsion (autosomal dominant)); EDN1 (Endothelin 1); EGFL2 (EGF-like-domain, multiple 2); F5 (Coagulation factor V (proaccelerin, labile factor)); FMO1 (Flavin containing monooxygenase 1); FUS (Fusion, derived from t(12;16) malignant liposarcoma); FVT1 (Follicular lymphoma variant translocation 1); GARS (Glycyl-tRNA synthetase); GZMB (Granzyme B (granzyme 2, cytotoxic T-lymphocyte-associated serine esterase 1)); GZMK (Granzyme K (serine protease, granzyme 3; tryptase II)); HGFAC (HGF activator); HRMTIL2 (HMT1 (hnRNP methyltransferase, S. cerevisiae)-like 2); HSJ1 (Heat shock protein, neuronal DNAJ-like 1); HSJ2 (Heat shock protein, DNAJ-like 2); IDUA (Iduronidase, alpha-L-); IGFBP10 (Insulin-like growth factor binding protein 10); LDHA (Lactate dehydrogenase A); LDHB (Lactate dehydrogenase B); LGALS1 (Lectin, galactoside-binding, soluble, 1 (galectin 1)); LMO1 (LIM domain only 1 (rhombotin 1)); LNPEP (Leucyl/cystinyl aminopeptidase); LPP (LIM domain-containing preferred translocation partner in lipoma); MANA2 (Mannosidase, alpha type II); MAOA (Monoamine oxidase A); MFNG (Manic fringe (Drosophila) homolog); MMP-20 (Enamelysin); MMP10 (Matrix metalloproteinase 10 (stromelysin 2)); MMP19 (Matrix metalloproteinase 19); MMP8 (Matrix metalloproteinase 8 (neutrophil collagenase)); MT7SDNA (7S DNA); NB (Neuroblastoma (neuroblastoma suppressor)); NB4S (Neuroblastoma stage 4S gene); NPAT (Nuclear protein, ataxia-telangiectasia locus); OAS2 (2'-5' oligoadenylate synthetase 2); ORCTL3 (Organic cationic transporter-like 3); PDHA1 (Pyruvate dehydrogenase (lipoamide) alpha 1); PGAM1 (Phosphoglycerate mutase 1 (brain)); PITX2 (Paired-like homeodomain transcription factor 2); PRNP (Prion protein (p27-30) (Creutzfeldt-Jakob disease, Gerstmann-Strausler-Scheinker syndrome, fatal familial insomnia)); PRSM1 (Protease, metallo, 1, 33kD); PTGS2 (Prostaglandin-endoperoxide synthase 2 (prostaglandin G/H synthase and cyclooxygenase)); RAD50 (RAD50 (S. cerevisiae) homolog); RAD51C (RAD51 (S. cerevisiae) homolog C); RCN2 (Reticulocalbin 2, EF-hand calcium binding domain); SET (SET translocation (myeloid leukemia-associated)); SIAT4A (Sialyltransferase 4A (beta-galactosidase alpha-2,3-sialyltransferase)); SPARC (Secreted protein, acidic, cysteine-rich (osteonectin)); TAL1 (T-cell acute lymphocytic leukemia 1); TBG (Thyroxine-binding globulin); TFF1 (Trefoil factor 1 (breast cancer, estrogen-inducible sequence expressed in)); TIMP4 (Tissue inhibitor of metalloproteinase 4); TSC1 (Tuberous sclerosis 1); TSC2 (Tuberous sclerosis 2); UCP2 (Uncoupling protein 2 (mitochondrial, proton carrier)); UROS (Uroporphyrinogen III synthase (congenital erythropoietic porphyria)); VWF (Von Willebrand factor); ANT2 (Adenine nucleotide translocator 2 (fibroblast)); BSEP (Bile salt export

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pump (ABC member 16, MDR/TAP subfamily)); GJB1 (Gap junction protein, beta 1, 32kD (connexin 32, Charcot-Marie-Tooth neuropathy, X-linked)); KCNN3 (Potassium intermediate/small conductance calcium-activated channel, subfamily N, member 3); OCLN (Occludin); PGY3 (P glycoprotein 3/multiple drug resistance 3); SLC2A3 (Solute carrier family 2 (facilitated glucose transporter), member 3); SLC2A5 (Solute carrier family 2 (facilitated glucose transporter), member 5); TAP1 (Transporter 1, ABC (ATP binding cassette)); TAPBP (TAP binding protein (tapasin)); ARHGDIB (Rho GDP dissociation inhibitor (GDI) beta); ATRX (Alpha thalassemia/mental retardation syndrome X-linked); BMZF2 (Zinc finger 2, bone marrow); BMZF3 (Bone marrow zinc finger 3); BPI (Bactericidal/permeability-increasing protein); CD14 (CD14 antigen); EPB41 (Erythrocyte membrane protein band 4.1 (elliptocytosis 1, RH-linked)); EPB42 (Erythrocyte membrane protein band 4.2); GATA1 (GATA-binding protein 1 (globin transcription factor 1)); GATA2 (GATA-binding protein 2); GATA3 (GATA-binding protein 3); GATA4 (GATA-binding protein 4); GATA6 (GATA-binding protein 6); GZMA (Granzyme A (granzyme 1, cytotoxic T-lymphocyte-associated serine esterase 3)); HBA1 (Hemoglobin, alpha 1); HBB (Hemoglobin, beta); HBG1 (Hemoglobin, gamma A); HBZ (Hemoglobin, zeta); HCF2 (Heparin cofactor II); HHEX (Hematopoietically expressed homeobox); HK2 (Hexokinase 2); HP (Haptoglobin); HPS (Hermansky-Pudlak syndrome); HPX (Hemopexin); LAF4 (Lymphoid nuclear protein related to AF4); LCPI (Lymphocyte cytosolic protein 1 (L-plastin)); LRMP (Lymphoid-restricted membrane protein); MAL (Mal, T-cell differentiation protein); MLL (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog)); MLL2 (Myeloid/lymphoid or mixed-lineage leukemia 2); MLLT1 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 1); MLLT2 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 2); MLLT3 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 3); MLLT4 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 4); MLLT6 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 6); MLLT7 (Myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 7); MPO (Myeloperoxidase); MYD88 (Myeloid differentiation primary response gene (88)); POU2F1 (POU domain, class 2, transcription factor 1); POU2F2 (POU domain, class 2, transcription factor 2); POU3F1 (POU domain, class 3, transcription factor 1); SCYC1 (Small inducible cytokine subfamily C, member 1 (lymphotactin)); TNFRSF17 (Tumor necrosis factor receptor superfamily, member 17); VWF (Von Willebrand factor);

Pharmacology

ALDH1 (Aldehyde dehydrogenase 1, soluble); ALDH10 (Aldehyde dehydrogenase 10 (fatty aldehyde dehydrogenase)); ALDH2 (Aldehyde dehydrogenase 2, mitochondrial); ALDH3 (Aldehyde dehydrogenase 3); ALDH6 (Aldehyde dehydrogenase 6); ALDH7 (Aldehyde dehydrogenase 7); ALDH8 (Aldehyde dehydrogenase 8); ANT2 (Adenine nucleotide translocator 2 (fibroblast)); APEX (APEX nuclease (multifunctional DNA repair enzyme)); BCHE (Butyrylcholinesterase); BLMH (Bleomycin hydrolase); CAT (Catalase); CDA (Cytidine deaminase); CYP11A (Cytochrome P450, subfamily XIA (cholesterol side chain cleavage)); CYP11B1 (Cytochrome P450, subfamily XIB (steroid 11-beta-hydroxylase), polypeptide 1); CYP11B2 (Cytochrome P450, subfamily XIB (steroid 11-beta-hydroxylase), polypeptide 2); CYP17 (Cytochrome P450, subfamily XVII (steroid 17-alpha-hydroxylase), adrenal hyperplasia); CYP19 (Cytochrome P450, subfamily XIX (aromatization of androgens)); CYP1A1 (Cytochrome P450, subfamily I (aromatic compound-inducible), polypeptide 1); CYP1A2 (Cytochrome P450, subfamily I (aromatic compound-inducible), polypeptide 2); CYP1B1 (Cytochrome P450, subfamily I (dioxin-inducible), polypeptide 1 (glaucoma 3, primary infantile)); CYP21 (Cytochrome P450, subfamily XXI (steroid 21-hydroxylase, congenital adrenal hyperplasia)); CYP27A1 (Cytochrome P450, subfamily XXVIIA (steroid 27-hydroxylase, cerebrotendinous xanthomatosis), polypeptide 1); CYP2A6 (Cytochrome P450, subfamily IIA (phenobarbital-inducible), polypeptide 6); CYP2B (Cytochrome P450, subfamily IIB (phenobarbital-inducible)); CYP2B6 (Cytochrome P450, subfamily IIB (phenobarbital-inducible), polypeptide 6); CYP2C18 (Cytochrome P450, subfamily IIC (mephenytoin 4-hydroxylase), polypeptide 18); CYP2C19 (Cytochrome P450, subfamily IIC (mephenytoin 4-hydroxylase)); CYP2C9 (Cytochrome P450, subfamily IIC (mephenytoin 4-hydroxylase), polypeptide 9); CYP2D6 (Cytochrome P450, subfamily IID (debrisoquine, sparteine, etc., -metabolizing), polypeptide 6); CYP2E (Cytochrome P450, subfamily IIE (ethanol-inducible)); CYP2F1 (Cytochrome P450, subfamily IIF, polypeptide 1); CYP2J2 (Cytochrome P450, subfamily IIJ (arachidonic acid epoxigenase) polypeptide 2); CYP3A3 (Cytochrome P450, subfamily IIIA (niphedipine oxidase), polypeptide 3); CYP3A5 (Cytochrome P450, subfamily IIIA (niphedipine oxidase), polypeptide 5); CYP3A7 (Cytochrome P450, subfamily IIIA, polypeptide 7); CYP4A11 (Cytochrome P450, subfamily IVA, polypeptide 11); CYP4F3 (Cytochrome P450, subfamily IVF, polypeptide 3 (leukotriene B4 omega hydroxylase)); CYP51 (Cytochrome P450, 51 (lanosterol 14-alpha-demethylase)); DCK (Deoxycytidine kinase); DGUOK (Deoxyguanosine kinase); DHFR (Dihydrofolate reductase); DIA4 (Diaphorase (NADH/NADPH) (cytochrome b-5 reductase)); DPYD (Dihydropyrimidine dehydrogenase); EPHX1 (Epoxide hydrolase 1, microsomal (xenobiotic)); EPHX2 (Epoxide hydrolase 2, cytoplasmic); GJB1 (Gap junction protein, beta 1, 32kD (connexin 32, Charcot-Marie-Tooth neuropathy, X-linked)); GLRX (Glutaredoxin (thioltransferase)); GPX1 (Glutathione peroxidase 1); GPX2 (Glutathione peroxidase 2 (gastrointestinal)); GPX3 (Glutathione peroxidase 3 (plasma)); GPX4 (Glutathione peroxidase 4 (phospholipid

hydroperoxidase)); GSR (Glutathione reductase); GSS (Glutathione synthetase); GSTA2 (Glutathione S-transferase A2); GSTA3 (Glutathione S-transferase A3); GSTM1 (Glutathione S-transferase M1); GSTM2 (Glutathione S-transferase M2 (muscle)); GSTM3 (Glutathione S-transferase M3 (brain)); GSTM4 (Glutathione S-transferase M4); GSTM5 (Glutathione S-transferase M5); GSTP1 (Glutathione S-transferase pi); GSTT1 (Glutathione S-transferase theta 1); GSTT2 (Glutathione S-transferase theta 2); GSTTLp28 (Glutathione-S-transferase like); GSTZ1 (Glutathione S-transferase Zeta 1 (maleylacetoacetate isomerase)); HPRT1 (Hypoxanthine phosphoribosyltransferase 1 (Lesch-Nyhan syndrome)); IMPDH1 (IMP (inosine monophosphate) dehydrogenase 1); IMPDH2 (IMP (inosine monophosphate) dehydrogenase 2); KCNN3 (Potassium intermediate/small conductance calcium-activated channel, subfamily N, member 3); MGST1 (Microsomal glutathione S-transferase 1); MGST2 (Microsomal glutathione S-transferase 2); MGST3 (Microsomal glutathione S-transferase 3); MRP1 (Multiple drug resistance protein 1); NAT1 (N-acetyltransferase 1 (arylamine N-acetyltransferase)); NMOR2 (NAD(P)H menadione oxidoreductase 2, dioxin-inducible); OCLN (Occludin); PGY1 (P glycoprotein 1/multiple drug resistance 1); PGY3 (P glycoprotein 3/multiple drug resistance 3); RRM1 (Ribonucleotide reductase M1 polypeptide); RRM2 (Ribonucleotide reductase M2 polypeptide); SLC2A3 (Solute carrier family 2 (facilitated glucose transporter), member 3); SLC2A5 (Solute carrier family 2 (facilitated glucose transporter), member 5); SOD1 (Superoxide dismutase 1, soluble (amyotrophic lateral sclerosis 1 (adult))); SOD2 (Superoxide dismutase 2, mitochondrial); SOD3 (Superoxide dismutase 3, extracellular); TAP1 (Transporter 1, ABC (ATP binding cassette)); TAPBP (TAP binding protein (tapasin)); TK1 (Thymidine kinase 1, soluble); TPMT (Thiopurine S-methyltransferase); TXNRD1 (Thioredoxin reductase 1); TYMS (Thymidylate synthetase); UGALT (UDP-galactose translocator); UGT2B10 (UDP glycosyltransferase 2 family, polypeptide B10); UGT2B15 (UDP glycosyltransferase 2 family, polypeptide B15); UGT2B4 (UDP glycosyltransferase 2 family, polypeptide B4); UGT2B7 (UDP glycosyltransferase 2 family, polypeptide B7); UGT8 (UDP glycosyltransferase 8 (UDP-galactose ceramide galactosyltransferase)); UMPS (Uridine monophosphate synthetase (orotate phosphoribosyl transferase and orotidine-5'-decarboxylase)); XDH (Xanthene dehydrogenase);

Signal transduction

ABL1 (V-abl Abelson murine leukemia viral oncogene homolog 1); ABL2 (V-abl Abelson murine leukemia viral oncogene homolog 2 (arg, Abelson-related gene)); ABR (Active BCR-related gene); ACVR1B (Activin A receptor, type IB); ADK (Adenosine kinase); ADRBK1 (Adrenergic, beta, receptor kinase 1); AK1 (Adenylate kinase 1); AK2 (Adenylate kinase 2); AK3 (Adenylate kinase 3); AKT1 (V-akt murine thymoma viral oncogene homolog 1); AKT2 (V-akt murine thymoma viral oncogene homolog 2); ALOX12 (Arachidonate 12-lipoxygenase); ALOX5 (Arachidonate 5-lipoxygenase); ARAF1 (V-raf murine sarcoma 3611 viral oncogene homolog 1); ARHA (Ras homolog gene family, member A); ARHC (Ras homolog gene family, member C); ARHGDIB (Rho GDP dissociation inhibitor (GDI) beta); BLK (B lymphoid tyrosine kinase); BMPR2 (Bone morphogenetic protein receptor, type II (serine/threonine kinase)); BMX (BMX non-receptor tyrosine kinase); BRAF (V-raf murine sarcoma viral oncogene homolog B1); BTK (Bruton agammaglobulinemia tyrosine kinase); CAK (Cell adhesion kinase); CALM1 (Calmodulin 1 (phosphorylase kinase, delta)); CAMK4 (Calcium/calmodulin-dependent protein kinase IV); CBLB (Cas-Br-M (murine) ectropic retroviral transforming sequence b); CCNH (Cyclin H); CDC2L1 (Cell division cycle 2-like 1 (PITSLRE proteins)); CDC42 (Cell division cycle 42 (GTP-binding protein, 25kD)); CDC42 (Cell division cycle 42 (GTP-binding protein, 25kD)); CDC7L1 (CDC7 (cell division cycle 7, *S. cerevisiae*, homolog)-like 1); CDK2 (Cyclin-dependent kinase 2); CDK5 (Cyclin-dependent kinase 5); CDK6 (Cyclin-dependent kinase 6); CDK7 (Cyclin-dependent kinase 7 (homolog of *Xenopus* MO15 cdk-activating kinase)); CDK8 (Cyclin-dependent kinase 8); CDKN2B (Cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)); CHEK1 (CHK1 (checkpoint, *S.pombe*) homolog); CHN1 (Chimerin (chimaerin) 1); CHN2 (Chimerin (chimaerin) 2); CHUK (Conserved helix-loop-helix ubiquitous kinase); CIS4 (STAT induced STAT inhibitor-4); CKS1 (CDC28 protein kinase 1); CKS2 (CDC28 protein kinase 2); CLGN (Calmegin); CLK2 (CDC-like kinase 2); CLK3 (CDC-like kinase 3); CNK (Cytokine-inducible kinase); COT (Cot (cancer Osaka thyroid) oncogene); CSK (C-src tyrosine kinase); CSNK1A1 (Casein kinase 1, alpha 1); CSNK1D (Casein kinase 1, delta); CSNK1E (Casein kinase 1, epsilon); CSNK2A2 (Casein kinase 2, alpha prime polypeptide); CSNK2B (Casein kinase 2, beta polypeptide); CTNNA1 (Catenin (cadherin-associated protein), alpha 1 (102kD)); CTNNB1 (Catenin (cadherin-associated protein), beta 1 (88kD)); CTNND2 (Catenin (cadherin-associated protein), delta 2 (neural plakophilin-related arm-repeat protein)); DGKA (Diacylglycerol kinase, alpha (80kD)); DGKG (Diacylglycerol kinase, gamma (90kD)); DGKQ (Diacylglycerol kinase, theta (110kD)); DMPK (Dystrophin myotonia-protein kinase); DRG2 (Developmentally regulated GTP-binding protein 2); DVL3 (Dishevelled 3 (homologous to *Drosophila* dsh)); DYRK1 (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1); DYRK1B (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 1B); DYRK2 (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 2); DYRK3 (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 3); DYRK4 (Dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 4); EFNA1 (Ephrin-A1); EFNA5 (Ephrin-A5); EFNB1 (Ephrin-B1); EFNB2 (Ephrin-B2); EGFR (Epidermal growth factor receptor (avian erythroblastic leukemia viral (v-erb-b) oncogene homolog)); EPHA2 (EphA2); EPHA4 (EphA4); EPHA5 (EphA5); EPHA7 (EphA7); EPHB3

(EphB3); EPHB4 (EphB4); EPHB6 (EphB6); ERBB2 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 2 (neuro/glioblastoma derived oncogene homolog)); ERBB3 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 3); ERBB4 (V-erb-a avian erythroblastic leukemia viral oncogene homolog-like 4); FBL (Fibrillarlin); FER (Fer (fps/fes related) tyrosine kinase (phosphoprotein NCP94)); FES (Feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fps) oncogene homolog); FGFR1 (Fibroblast growth factor receptor 1 (fms-related tyrosine kinase 2, Pfeiffer syndrome)); FGFR2 (Fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome, Pfeiffer syndrome, Jackson-Weiss syndrome)); FGR (Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog); FLT1 (Fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)); FLT3LG (Fms-related tyrosine kinase 3 ligand); FLT4 (Fms-related tyrosine kinase 4); FRK (Fyn-related kinase); Fyb (FYN-binding protein (Fyb-120/130)); FYN (FYN oncogene related to SRC, FGR, YES); GLA (Galactosidase, alpha); GNAI1 (Guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 1); GNG10 (Guanine nucleotide binding protein 10); GPRK6 (G protein-coupled receptor kinase 6); GRB2 (Growth factor receptor-bound protein 2); GUCY1B3 (Guanylate cyclase 1, soluble, beta 3); HCK (Hemopoietic cell kinase); HIPK3 (Homeodomain-interacting protein kinase 3); HRK (Harakiri, BCL2-interacting protein (contains only BH3 domain)); ILK (Integrin-linked kinase); IRAK1 (Interleukin-1 receptor-associated kinase 1); IRAK2 (Interleukin-1 receptor-associated kinase 2); ITPKB (Inositol 1,4,5-trisphosphate 3-kinase B); JAK1 (Janus kinase 1 (a protein tyrosine kinase)); JAK2 (Janus kinase 2 (a protein tyrosine kinase)); JAK3 (Janus kinase 3 (a protein tyrosine kinase, leukocyte)); KDR (Kinase insert domain receptor (a type III receptor tyrosine kinase)); KIAA0641 (Apoptosis-associated tyrosine kinase); LCAT (Lecithin-cholesterol acyltransferase); LCK (Lymphocyte-specific protein tyrosine kinase); LIMK1 (LIM domain kinase 1); LIMK2 (LIM domain kinase 2); LTK (Leukocyte tyrosine kinase); LYN (V-yes-1 Yamaguchi sarcoma viral related oncogene homolog); MACS (Myristoylated alanine-rich protein kinase C substrate (MARCKS, 80K-L)); MADH1 (MAD (mothers against decapentaplegic, Drosophila) homolog 1); MADH2 (MAD (mothers against decapentaplegic, Drosophila) homolog 2); MADH3 (MAD (mothers against decapentaplegic, Drosophila) homolog 3); MAPKAPK2 (Mitogen-activated protein kinase-activated protein kinase 2); MAPKAPK5 (Mitogen-activated protein kinase-activated protein kinase 5); MATK (Megakaryocyte-associated tyrosine kinase); MEKK3 (MAP/ERK kinase kinase 3); MEKK4 (MAP/ERK kinase kinase 4); MEKK5 (MAP/ERK kinase kinase 5); MST1R (Macrophage stimulating 1 receptor (c-met-related tyrosine kinase)); NCK1 (NCK adaptor protein 1); NEK3 (NIMA (never in mitosis gene a)-related kinase); NME1 (Non-metastatic cells 1, protein (NM23A) expressed in); NME2 (Non-metastatic cells 2, protein (NM23B) expressed in); NMI (N-myc (and STAT) interactor); NPM1 (Nucleophosmin (nucleolar phosphoprotein B23, numatrin)); NTRK1 (Neurotrophic tyrosine kinase, receptor, type 1); NTRK2 (Neurotrophic tyrosine kinase, receptor, type 2); NTRK3 (Neurotrophic tyrosine kinase, receptor, type 3); NTRKR1 (Neurotrophic tyrosine kinase, receptor-related 1); NTRKR2 (Neurotrophic tyrosine kinase, receptor-related 2); NTRKR3 (Neurotrophic tyrosine kinase, receptor-related 3); PCKT3 (PCTAIRE protein kinase 3); PDE4B (Phosphodiesterase 4B, cAMP-specific (dunce (Drosophila)-homolog phosphodiesterase E4)); PDGFA (Platelet-derived growth factor alpha polypeptide); PDGFB (Platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)); PDGFRA (Platelet-derived growth factor receptor, alpha polypeptide); PDGFRB (Platelet-derived growth factor receptor, beta polypeptide); PDGFRL (Platelet-derived growth factor receptor-like); PDK2 (Pyruvate dehydrogenase kinase, isoenzyme 2); PDK4 (Pyruvate dehydrogenase kinase, isoenzyme 4); PDPK1 (3-phosphoinositide dependent protein kinase-1); PHKA2 (Phosphorylase kinase, alpha 2 (liver), glycogen storage disease IX); PHKG2 (Phosphorylase kinase, gamma 2 (testis)); PIASX-BETA (Protein inhibitor of activated STAT X); PIK3C3 (Phosphoinositide-3-kinase, class 3); PIK3CA (Phosphoinositide-3-kinase, catalytic, alpha polypeptide); PIK3CB (Phosphoinositide-3-kinase, catalytic, alpha polypeptide); PIK3CG (Phosphoinositide-3-kinase, catalytic, gamma polypeptide); PIM1 (Pim-1 oncogene); PLA2G2A (Phospholipase A2, group IIA (platelets, synovial fluid)); PLCB4 (Phospholipase C, beta 4); PLCE (Phospholipase C, epsilon); PLCG2 (Phospholipase C, gamma 2 (phosphatidylinositol-specific)); PPP2R5A (Protein phosphatase 2, regulatory subunit B (B56), alpha isoform); PPP2R5B (Protein phosphatase 2, regulatory subunit B (B56), beta isoform); PPP2R5C (Protein phosphatase 2, regulatory subunit B (B56), gamma isoform); PPP2R5D (Protein phosphatase 2, regulatory subunit B (B56), delta isoform); PPP2R5E (Protein phosphatase 2, regulatory subunit B (B56), epsilon isoform); PRKAA2 (Protein kinase, AMP-activated, alpha 2 catalytic subunit); PRKACA (Protein kinase, cAMP-dependent, catalytic, alpha); PRKACB (Protein kinase, cAMP-dependent, catalytic, beta); PRKACG (Protein kinase, cAMP-dependent, catalytic, gamma); PRKAG1 (Protein kinase, AMP-activated, gamma 1 non-catalytic subunit); PRKARIA (Protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)); PRKAR1B (Protein kinase, cAMP-dependent, regulatory, type I, beta); PRKAR2B (Protein kinase, cAMP-dependent, regulatory, type II, beta); PRKCA (Protein kinase C, alpha); PRKCB1 (Protein kinase C, beta 1); PRKCG (Protein kinase C, gamma); PRKCI (Protein kinase C, iota); PRKCL1 (Protein kinase C-like 1); PRKCL2 (Protein kinase C-like 2); PRKCM (Protein kinase C, mu); PRKCQ (Protein kinase C, theta); PRKCZ (Protein kinase C, zeta); PRKG1 (Protein kinase, cGMP-dependent, type I); PRKG2 (Protein kinase, cGMP-dependent, type II); PRKM1 (Protein kinase, mitogen-activated 1 (MAP kinase 1; p40, p41)); PRKM10 (Protein kinase mitogen-activated 10 (MAP kinase)); PRKM11 (Protein kinase mitogen-

activated 11); PRKM13 (Protein kinase mitogen- activated 13); PRKM3 (Protein kinase, mitogen-activated 3 (MAP kinase 3; p44)); PRKM4 (Protein kinase, mitogen-activated 4 (MAP kinase 4; p63)); PRKM6 (Protein kinase, mitogen-activated 6 (extracellular signal-regulated kinase, p97)); PRKM7 (Protein kinase mitogen-activated 7 (MAP kinase)); PRKM8 (Protein kinase mitogen-activated 8 (MAP kinase)); PRKM9 (Protein kinase mitogen-activated 9 (MAP kinase)); PRKMK1 (Protein kinase, mitogen-activated, kinase 1 (MAP kinase kinase 1)); PRKMK1 (Protein kinase, mitogen-activated, kinase 1 (MAP kinase kinase 1)); PRKMK2 (Protein kinase, mitogen-activated, kinase 2, p45 (MAP kinase kinase 2)); PRKMK3 (Protein kinase, mitogen-activated, kinase 3 (MAP kinase kinase 3)); PRKMK5 (Protein kinase, mitogen-activated, kinase 5 (MAP kinase kinase 5)); PRKMK7 (Protein kinase, mitogen-activated, kinase 7 (MAP kinase kinase 7)); PRKR (Protein kinase, interferon-inducible double stranded RNA dependent); PTK2 (PTK2 protein tyrosine kinase 2); PTK2B (Protein tyrosine kinase 2 beta); PTK7 (PTK7 protein tyrosine kinase 7); PTK9 (Protein tyrosine kinase 9); RAB8IP (Rab8 interacting protein (GC kinase)); RASA1 (RAS p21 protein activator (GTPase activating protein) 1); RET (Ret proto-oncogene (multiple endocrine neoplasia MEN2A, MEN2B and medullary thyroid carcinoma 1, Hirschsprung disease)); RGS1 (Regulator of G-protein signalling 1); RGS16 (Regulator of G-protein signalling 16); RGS7 (Regulator of G-protein signalling 7); RHO7 (GTP-binding protein Rho7); RHOK (Rhodopsin kinase); ROCK1 (Rho-associated, coiled-coil containing protein kinase 1); RPS6KA2 (Ribosomal protein S6 kinase, 90kD, polypeptide 2); RPS6KB1 (Ribosomal protein S6 kinase, 70kD, polypeptide 1); RYK (RYK receptor-like tyrosine kinase); SAPK3 (Stress-activated protein kinase 3); SERK1 (SAPK/Erk kinase 1); SFN (Stratifin); SH2D1A (SH2 domain protein 1A, Duncan's disease (lymphoproliferative syndrome)); SH3D1B (SH3 domain protein 1B); SRC (V-src avian sarcoma (Schmidt-Ruppin A-2) viral oncogene homolog); SRPK2 (SRFS protein kinase 2); SSI-1 (JAK binding protein); SSI-3 (STAT induced STAT inhibitor 3); STAT1 (Signal transducer and activator of transcription 1, 91kD); STAT2 (Signal transducer and activator of transcription 2, 113kD); STAT3 (Signal transducer and activator of transcription 3 (acute-phase response factor)); STAT4 (Signal transducer and activator of transcription 4); STAT5A (Signal transducer and activator of transcription 5A); STAT6 (Signal transducer and activator of transcription 6, interleukin-4 induced); STATI2 (STAT induced STAT inhibitor-2); STK11 (Serine/threonine kinase 11 (Peutz-Jeghers syndrome)); STK15 (Serine/threonine kinase 15); STK17A (Serine/threonine kinase 17a (apoptosis-inducing)); STK17B (Serine/threonine kinase 17b (apoptosis-inducing)); STK2 (Serine/threonine kinase 2); STK3 (Serine/threonine kinase 3 (Ste20, yeast homolog)); STK4 (Serine/threonine kinase 4); SUB1.5 (Guanine nucleotide exchange factor; 115-kD; mouse Lsc homolog); SYK (Spleen tyrosine kinase); TESK1 (Testis-specific kinase 1); TIAM1 (T-cell lymphoma invasion and metastasis 1); TK2 (Thymidine kinase 2, mitochondrial); TNFAIP1 (Tumor necrosis factor, alpha-induced protein 1 (endothelial)); TRK (Oncogene TRK); TRK1 (TRNA lysine 1); TTK (TTK protein kinase); TXK (TXK tyrosine kinase); TYK2 (Tyrosine kinase 2); TYRO3 (TYRO3 protein tyrosine kinase); TYROBP (TYRO protein tyrosine kinase binding protein); UBE1L (Ubiquitin-activating enzyme E1, like); UBE2A (Ubiquitin-conjugating enzyme E2A (RAD6 homolog)); UBE2B (Ubiquitin-conjugating enzyme E2B (RAD6 homolog)); VASP (Vasodilator-stimulated phosphoprotein); VAV2 (Vav 2 oncogene); VRK2 (Vaccinia related kinase 2); WAS (Wiskott-Aldrich syndrome (eczema-thrombocytopenia)); YES1 (V-yes-1 Yamaguchi sarcoma viral oncogene homolog 1); YESP (V-yes-1 Yamaguchi sarcoma viral oncogene homolog pseudogene); ZAP70 (Zeta-chain (TCR) associated protein kinase (70 kD)); ZPK (Zipper (leucine) protein kinase);

Transcription

ADA (Adenosine deaminase); ADPRT (ADP-ribosyltransferase (NAD⁺; poly (ADP-ribose) polymerase)); ADSS (Adenylosuccinate synthase); AHR (Aryl hydrocarbon receptor); ATBF1 (AT-binding transcription factor 1); ATF1 (Activating transcription factor 1); ATF3 (Activating transcription factor 3); ATF4 (Activating transcription factor 4 (tax-responsive enhancer element B67)); BARD1 (BRCA1 associated RING domain 1); BCL6 (B-cell CLL/lymphoma 6 (zinc finger protein 51)); BMZF2 (Zinc finger 2, bone marrow); BMZF3 (Bone marrow zinc finger 3); CBF2 (CCAAT-box-binding transcription factor); CBFA2 (Core-binding factor, runt domain, alpha subunit 2 (acute myeloid leukemia 1; aml1 oncogene)); CBFA3 (Core-binding factor, runt domain, alpha subunit 3); CBFB (Core-binding factor, beta subunit); CEBPA (CCAAT/enhancer binding protein (C/EBP), alpha); CEBPB (CCAAT/enhancer binding protein (C/EBP), beta); CEBPD (CCAAT/enhancer binding protein (C/EBP), delta); CEBPE (CCAAT/enhancer binding protein (C/EBP), epsilon); CEBPG (CCAAT/enhancer binding protein (C/EBP), gamma); CENPE (Centromere protein E (312kD)); CHD1 (Chromodomain helicase DNA binding protein 1); CHD2 (Chromodomain helicase DNA binding protein 2); CHD3 (Chromodomain helicase DNA binding protein 3); CHD4 (Chromodomain helicase DNA binding protein 4); CREB2 (CAMP responsive element binding protein 2); CREBBP (CREB binding protein (Rubinstein-Taybi syndrome)); CSE1L (Chromosome segregation 1 (yeast homolog)-like); CSTF3 (Cleavage stimulation factor, 3' pre-RNA, subunit 3, 77kD); CTPS (CTP synthase); DCK (Deoxycytidine kinase); DCTD (DCMP deaminase); DDIT3 (DNA-damage-inducible transcript 3); DGUOK (Deoxyguanosine kinase); DR1 (Down-regulator of transcription 1, TBP-binding (negative cofactor 2)); DUT (DUTP pyrophosphatase); E2F1 (E2F transcription factor 1); E2F2 (E2F transcription factor 2); E2F5 (E2F transcription factor 5, p130-binding); EGR1 (Early growth response 1); EIF3S6 (Eukaryotic translation initiation factor 3, subunit 6 (48kD)); ELF1 (E74-like factor 1 (ets domain transcription factor)); ELF3 (E74-like factor 3 (ets domain transcription factor)); ELK4 (ELK4,

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ETS-domain protein (SRF accessory protein 1) NOTE: Symbol and name provisional); EP300 (E1A binding protein p300); ERV3 (Endogenous retroviral sequence 3 (includes zinc finger protein H-plk/HPF9)); ESR1 (Estrogen receptor 1); ETS2 (V-ets avian erythroblastosis virus E26 oncogene homolog 2); ETV1 (Ets variant gene 1); ETV3 (Ets variant gene 3); ETV4 (Ets variant gene 4 (E1A enhancer-binding protein, E1AF)); ETV5 (Ets variant gene 5 (ets-related molecule)); EZF (Endothelial Kruppel-like zinc finger protein); FKHR (Forkhead (*Drosophila*) homolog 1 (rhabdomyosarcoma)); FLI1 (Friend leukemia virus integration 1); FSRG1 (Female sterile homeotic-related gene 1 (mouse homolog)); GART (Phosphoribosylglycinamide formyltransferase, phosphoribosylglycinamide synthetase, phosphoribosylaminoimidazole synthetase); GATA1 (GATA-binding protein 1 (globin transcription factor 1)); GATA2 (GATA-binding protein 2); GATA3 (GATA-binding protein 3); GATA4 (GATA-binding protein 4); GLI (Glioma-associated oncogene homolog (zinc finger protein)); GRSF1 (G-rich RNA sequence binding factor 1); GTF2H2 (General transcription factor IIH, polypeptide 2 (44kD subunit)); H4FI (H4 histone family, member I); HHEX (Hematopoietically expressed homeobox); HIF1A (Hypoxia-inducible factor 1, alpha subunit (basic helix-loop-helix transcription factor)); HIVEP1 (Human immunodeficiency virus type I enhancer-binding protein 1); HLF (Hepatic leukemia factor); HMG17 (High-mobility group (nonhistone chromosomal) protein 17); HMG2 (High-mobility group (nonhistone chromosomal) protein 2); HNRPK (Heterogeneous nuclear ribonucleoprotein K); HZF2 (Zinc finger (C2H2)); ICSBP1 (Interferon consensus sequence binding protein 1); ID1 (Inhibitor of DNA binding 1, dominant negative helix-loop-helix protein); ID2 (Inhibitor of DNA binding 2, dominant negative helix-loop-helix protein); ID3 (Inhibitor of DNA binding 3, dominant negative helix-loop-helix protein); ID4 (Inhibitor of DNA binding 4, dominant negative helix-loop-helix protein); IRF1 (Interferon regulatory factor 1); IRF2 (Interferon regulatory factor 2); IRF4 (Interferon regulatory factor 4); IRF5 (Interferon regulatory factor 5); IRF7 (Interferon regulatory factor 7); JUN (V-jun avian sarcoma virus 17 oncogene homolog); JUND (Jun D proto-oncogene); KIAA0646 (C3HC4-type zinc finger protein); LAF4 (Lymphoid nuclear protein related to AF4); LKLF (Lung Kruppel-like zinc finger transcription factor); LYF1 (Zinc finger protein, subfamily 1A, 1 (Ikaro)); LYL1 (Lymphoblastic leukemia derived sequence 1); MAFG (V-maf musculoaponeurotic fibrosarcoma (avian) oncogene family, protein G); MAX (MAX protein); MAZ (MYC-associated zinc finger protein (purine-binding transcription factor)); MBL1 (C3H-type zinc finger protein; similar to *D. melanogaster* muscleblind B protein); MDM2 (Mouse double minute 2, human homolog of; p53-binding protein); MHC2TA (MHC class II transactivator); MKI67 (Antigen identified by monoclonal antibody Ki-67); MNDA (Myeloid cell nuclear differentiation antigen); MSX1 (Msh (*Drosophila*) homeo box homolog 1 (formerly homeo box 7)); MTHFD (5,10-methylenetetrahydrofolate dehydrogenase, 5,10-methylenetetrahydrofolate cyclohydrolase, 10-formyltetrahydrofolate synthetase); MYC (V-myc avian myelocytomatosis viral oncogene homolog); NCBP (Nuclear cap binding protein, 80kD); NCBP (Nuclear cap binding protein, 80kD); NDP52 (Nuclear domain 10 protein); NFE2 (Nuclear factor (erythroid-derived 2), 45kD); NFKB1 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105)); NFKB2 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)); NFYA (Nuclear transcription factor Y, alpha); NP (Nucleoside phosphorylase); NURR1 (Nuclear receptor related 1 (transcriptionally inducible)); ODC1 (Ornithine decarboxylase 1); PAX3 (Paired box gene 3 (Waardenburg syndrome 1)); PBX1 (Pre-B-cell leukemia transcription factor 1); PBX3 (Pre-B-cell leukemia transcription factor 3); PCNA (Proliferating cell nuclear antigen); PEX6 (Peroxisomal biogenesis factor 6); PITX2 (Paired-like homeodomain transcription factor 2); PML (Promyelocytic leukemia); POU1F1 (POU domain, class 1, transcription factor 1 (Pit1, growth hormone factor 1)); POU2AF1 (POU domain, class 2, associating factor 1); POU2F1 (POU domain, class 2, transcription factor 1); POU2F2 (POU domain, class 2, transcription factor 2); POU3F1 (POU domain, class 3, transcription factor 1); POU3F2 (POU domain, class 3, transcription factor 2); POU5F1 (POU domain, class 5, transcription factor 1); PPAT (Phosphoribosyl pyrophosphate amidotransferase); PRPS1 (Phosphoribosyl pyrophosphate synthetase 1); PTB (Polypyrimidine tract binding protein (heterogeneous nuclear ribonucleoprotein I)); RANBP2 (RAN binding protein 2); RARB (Retinoic acid receptor, beta); RARG (Retinoic acid receptor, gamma); RECQL (RecQ protein-like (DNA helicase Q1-like)); RENBP (Renin-binding protein); RFX1 (Regulatory factor X, 1 (influences HLA class II expression)); RFX2 (Regulatory factor X, 2 (influences HLA class II expression)); RFX3 (Regulatory factor X, 3 (influences HLA class II expression)); RFX4 (Regulatory factor X, 4 (influences HLA class II expression)); RFX5 (Regulatory factor X, 5 (influences HLA class II expression)); RFXAP (Regulatory factor X-associated protein); RXRA (Retinoid X receptor, alpha); SATB1 (Special AT-rich sequence binding protein 1 (binds to nuclear matrix/scaffold-associating DNA's)); SFRS7 (Splicing factor, arginine/serine-rich 7 (35kD)); SKIL (SKI-like); SLUG (Slug (chicken homolog), zinc finger protein); SMARCA2 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2); SON (SON DNA binding protein); SOX4 (SRY (sex determining region Y)-box 4); SP100 (Nuclear antigen Sp100); SPIB (Spi-B transcription factor (Spi-1/PU.1 related)); SRF (Serum response factor (c-fos serum response element-binding transcription factor)); STAT3 (Signal transducer and activator of transcription 3 (acute-phase response factor)); STAT4 (Signal transducer and activator of transcription 4); STAT5A (Signal transducer and activator of transcription 5A); TAF2C2 (TATA box binding protein (TBP)-associated factor, RNA polymerase II, C2, 105kD); TAL2 (T-cell acute lymphocytic leukemia 2); TCEB1L (Transcription elongation factor B (SIII), polypeptide 1-like); TCF1 (Transcription factor 1, hepatic;

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LF-B1, hepatic nuclear factor (HNF1), albumin proximal factor); TCF12 (Transcription factor 12 (HTF4, helix-loop-helix transcription factors 4)); TCF3 (Transcription factor 3 (E2A immunoglobulin enhancer binding factors E12/E47)); TCF7 (Transcription factor 7 (T-cell specific, HMG-box)); TCF8 (Transcription factor 8 (represses interleukin 2 expression)); TCF9 (Transcription factor 9 (binds GC-rich sequences)); TEGT (Testis enhanced gene transcript); TFAP2B (Transcription factor AP-2 beta (activating enhancer-binding protein 2 beta)); TFAP4 (Transcription factor AP-4 (activating enhancer-binding protein 4)); TFD2 (Transcription factor Dp-2 (E2F dimerization partner 2)); THRA (Thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog)); TIAL1 (TIA1 cytotoxic granule-associated RNA-binding protein-like 1); TK1 (Thymidine kinase 1, soluble); TOP1 (Topoisomerase (DNA) I); TOP2B (Topoisomerase (DNA) II beta (180kD)); TP53 (Tumor protein p53 (Li-Fraumeni syndrome)); UBL1 (Ubiquitin-like 1 (sentrin)); WT1 (Wilms tumor 1); WT1 (Wilms tumor 1); XPO1 (Exportin 1 (CRM1, yeast, homolog)); ZFP103 (Zinc finger protein homologous to Zfp103 in mouse); ZFP36 (Zinc finger protein homologous to Zfp-36 in mouse); ZFP37 (Zinc finger protein homologous to Zfp37 in mouse); ZFP93 (Zinc finger protein); ZFX (Zinc finger protein, X-linked); ZFY (Zinc finger protein, Y-linked); ZK1 (Kruppel-type zinc finger (C2H2)); ZNF10 (Zinc finger protein 10 (KOX 1)); ZNF121 (Zinc finger protein 121 (clone ZHC32)); ZNF124 (Zinc finger protein 124 (HZF-16)); ZNF127 (Zinc finger protein 127); ZNF131 (Zinc finger protein 131 (clone pHZ-10)); ZNF132 (Zinc finger protein 132 (clone pHZ-12)); ZNF133 (Zinc finger protein 133 (clone pHZ-13)); ZNF134 (Zinc finger protein 134 (clone pHZ-15)); ZNF135 (Zinc finger protein 135 (clone pHZ-17)); ZNF136 (Zinc finger protein 136 (clone pHZ-20)); ZNF137 (Zinc finger protein 137 (clone pHZ-30)); ZNF139 (Zinc finger protein 139 (clone pHZ-37)); ZNF140 (Zinc finger protein 140 (clone pHZ-39)); ZNF141 (Zinc finger protein 141 (clone pHZ-44)); ZNF142 (Zinc finger protein 142 (clone pHZ-49)); ZNF143 (Zinc finger protein 143 (clone pHZ-1)); ZNF144 (Zinc finger protein 144 (Mel-18)); ZNF145 (Zinc finger protein 145 (Kruppel-like, expressed in promyelocytic leukemia)); ZNF147 (Zinc finger protein 147 (estrogen-responsive finger protein)); ZNF148 (Zinc finger protein 148 (pHZ-52)); ZNF151 (Zinc finger protein 151 (pHZ-67)); ZNF154 (Zinc finger protein 154 (pHZ-92)); ZNF155 (Zinc finger protein 155 (pHZ-96)); ZNF157 (Zinc finger protein 157 (HZF22)); ZNF162 (Zinc finger protein 162); ZNF165 (Zinc finger protein 165); ZNF169 (Zinc finger protein 169); ZNF173 (Zinc finger protein 173); ZNF177 (Zinc finger protein 177); ZNF189 (Zinc finger protein 189); ZNF198 (Zinc finger protein 198); ZNF2 (Zinc finger protein 2); ZNF20 (Zinc finger protein, C2H2, rapidly turned over); ZNF200 (Zinc finger protein 200); ZNF202 (Zinc finger protein 202); ZNF204 (Zinc finger protein 204); ZNF205 (Zinc finger protein 205); ZNF206 (Zinc finger protein 206); ZNF207 (Zinc finger protein 207); ZNF239 (Zinc finger protein 239); ZNF259 (Zinc finger protein 259); ZNF261 (Zinc finger protein 261); ZNF262 (Zinc finger protein 262); ZNF263 (Zinc finger protein 263); ZNF264 (Zinc finger protein 264); ZNF3 (Zinc finger protein 3 (A8-51)); ZNF35 (Zinc finger protein 35 (clone HF.10)); ZNF37A (Zinc finger protein 37a (KOX 21)); ZNF42 (Zinc finger protein 42 (myeloid-specific retinoic acid- responsive)); ZNF44 (Zinc finger protein 44 (KOX 7)); ZNF45 (Zinc finger protein 45 (a Kruppel-associated box (KRAB) domain polypeptide)); ZNF6 (Zinc finger protein 6 (CMPX1)); ZNF7 (Zinc finger protein 7 (KOX 4, clone HF.16)); ZNF74 (Zinc finger protein 74 (Cos52)); ZNF76 (Zinc finger protein 76 (expressed in testis)); ZNF8 (Zinc finger protein 8 (clone HF.18)); ZNF84 (Zinc finger protein 84 (HPF2)); ZNF85 (Zinc finger protein 85); ZNF9 (Zinc finger protein 9 (a cellular retroviral nucleic acid binding protein)); ZNF91 (Zinc finger protein 91 (HPF7, HTF10));

Tumor Suppressor/Oncogenes

ABL1 (V-abl Abelson murine leukemia viral oncogene homolog 1); ABL2 (V-abl Abelson murine leukemia viral oncogene homolog 2 (arg, Abelson-related gene)); AKT1 (V-akt murine thymoma viral oncogene homolog 1); AKT2 (V-akt murine thymoma viral oncogene homolog 2); APC (Adenomatosis polyposis coli); ARAF1 (V-raf murine sarcoma 3611 viral oncogene homolog 1); ARAF2 (V-raf murine sarcoma 3611 viral oncogene homolog 2); ARHA (Ras homolog gene family, member A); ARHB (Ras homolog gene family, member B); ARHC (Ras homolog gene family, member C); AXL (AXL receptor tyrosine kinase); BCL2 (B-cell CLL/lymphoma 2); BCL3 (B-cell CLL/lymphoma 3); BCR (Breakpoint cluster region); BLYM (Avian lymphoma virus-derived transforming sequence); BMI1 (Murine leukemia viral (bmi-1) oncogene homolog); BRAF (V-raf murine sarcoma viral oncogene homolog B1); BRAFP (V-raf murine sarcoma viral oncogene homolog B1 pseudogene); CBFA2 (Core-binding factor, runt domain, alpha subunit 2 (acute myeloid leukemia 1; aml1 oncogene)); CBL (Cas-Br-M (murine) ecotropic retroviral transforming sequence); CCND1 (Cyclin D1 (PRAD1; parathyroid adenomatosis 1)); CDH1 (Cadherin 1, E-cadherin (epithelial)); CDK4 (Cyclin-dependent kinase 4); CDKN1A (Cyclin-dependent kinase inhibitor 1A (p21, Cip1)); CDKN1C (Cyclin-dependent kinase inhibitor 1C (p57, Kip2)); CDKN2A (Cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)); CHES1 (Checkpoint suppressor 1); COT (Cot (cancer Osaka thyroid) oncogene); CRK (V-crk avian sarcoma virus CT10 oncogene homolog); CRKL (V-crk avian sarcoma virus CT10 oncogene homolog-like); CSF1R (Colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog); D10S170 (DNA segment, single copy, probe pH4 (transforming sequence, thyroid-1)); DCC (Deleted in colorectal carcinoma); DDX6 (DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 6 (RNA helicase, 54kD)); E2F1 (E2F transcription factor 1); ECT2 (Epithelial cell transforming sequence 2 oncogene); EGFR (Epidermal

growth factor receptor (avian erythroblastic leukemia viral (v-erb-b) oncogene homolog)); EIF3S6 (Eukaryotic translation initiation factor 3, subunit 6 (48kD)); ELE1 (RET-activating gene ELE1); ELK1 (ELK1, member of ETS oncogene family); ELK2P1 (ELK2, member of ETS oncogene family, pseudogene 1); ELK3 (ELK3, ETS-domain protein (SRF accessory protein 2) NOTE: Symbol and name provisional.); EMP1 (Epithelial membrane protein 1); EMS1 (Ems1 sequence (mammary tumor and squamous cell carcinoma-associated (p80/85 src substrate)); EPHA1 (EphA1); EPHA3 (EphA3); ERBA2L (V-erb-a avian erythroblastic leukemia viral oncogene homolog 2-like); ERBAL2 (V-erb-a avian erythroblastic leukemia viral oncogene homolog-like 2); ERBB2 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 2 (neuro/glioblastoma derived oncogene homolog)); ERBB3 (V-erb-b2 avian erythroblastic leukemia viral oncogene homolog 3); ERBB4 (V-erb-a avian erythroblastic leukemia viral oncogene homolog-like 4); ERG (V-ets avian erythroblastosis virus E26 oncogene related); ETS1 (V-ets avian erythroblastosis virus E26 oncogene homolog 1); ETS2 (V-ets avian erythroblastosis virus E26 oncogene homolog 2); ETV1 (Ets variant gene 1); ETV3 (Ets variant gene 3); ETV6 (Ets variant gene 6 (TEL oncogene)); EVI1 (Ecotropic viral integration site 1); EWSR1 (Ewing sarcoma breakpoint region 1); FAT (FAT tumor suppressor (Drosophila) homolog); FER (Fer (fps/fes related) tyrosine kinase (phosphoprotein NCP94)); FES (Feline sarcoma (Snyder-Theilen) viral (v-fes)/Fujinami avian sarcoma (PRCII) viral (v-fps) oncogene homolog); FGF3 (Fibroblast growth factor 3 (murine mammary tumor virus integration site (v-int-2) oncogene homolog)); FGF4 (Fibroblast growth factor 4 (heparin secretory transforming protein 1, Kaposi sarcoma oncogene)); FGF6 (Fibroblast growth factor 6); FGR (Gardner-Rasheed feline sarcoma viral (v-fgr) oncogene homolog); FKHL1 (Forkhead (Drosophila)-like 1); FLI1 (Friend leukemia virus integration 1); FLT1 (Fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)); FOS (V-fos FBJ murine osteosarcoma viral oncogene homolog); FOSB (FBJ murine osteosarcoma viral oncogene homolog B); FOSL1 (FOS-like antigen-1); FOSL2 (FOS-like antigen 2); FYN (FYN oncogene related to SRC, FGR, YES); GLI (Glioma-associated oncogene homolog (zinc finger protein)); GLI2 (GLI-Kruppel family member GLI2); GLI3 (GLI-Kruppel family member GLI3 (Greig cephalopolysyndactyly syndrome)); GRF2 (Guanine nucleotide-releasing factor 2 (specific for crk proto-oncogene)); GRO1 (GRO1 oncogene (melanoma growth stimulating activity, alpha)); GRO2 (GRO2 oncogene); GRO3 (GRO3 oncogene); HCK (Hemopoietic cell kinase); HKR3 (GLI-Kruppel family member HKR3); HRAS (V-Ha-ras Harvey rat sarcoma viral oncogene homolog); HRASP (V-Ha-ras Harvey rat sarcoma viral oncogene homolog pseudogene); INT6P1 (Murine mammary tumor integration site 6 (oncogene homolog) pseudogene 1); IRF4 (Interferon regulatory factor 4); JUN (V-jun avian sarcoma virus 17 oncogene homolog); JUNB (Jun B proto-oncogene); JUND (Jun D proto-oncogene); KAI1 (Kangai 1 (suppression of tumorigenicity 6, prostate; CD82 antigen (R2 leukocyte antigen, antigen detected by monoclonal and antibody IA4)); KIT (V-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog); KRAS1P (V-Ki-ras1 Kirsten rat sarcoma 1 viral oncogene homolog, processed pseudogene); KRAS2 (V-Ki-ras2 Kirsten rat sarcoma 2 viral oncogene homolog); LBC (Lymphoid blast crisis oncogene); LCK (Lymphocyte-specific protein tyrosine kinase); LCN2 (Lipocalin 2 (oncogene 24p3)); LCO (Liver cancer oncogene); LPSA (Oncogene liposarcoma (DNA segment, single copy, expressed, probes); LTA (Lymphotoxin alpha (TNF superfamily, member 1)); LTB (Lymphotoxin beta (TNF superfamily, member 3)); LYN (V-yes-1 Yamaguchi sarcoma viral related oncogene homolog); MIS1 (Membrane component, chromosome 1, surface marker 1 (40kD glycoprotein, identified by monoclonal antibody GA733)); M4S1 (Membrane component, chromosomal 4, surface marker (35kD glycoprotein)); MADH4 (MAD (mothers against decapentaplegic, Drosophila) homolog 4); MAF (V-maf musculoaponeurotic fibrosarcoma (avian) oncogene homolog); MAFG (V-maf musculoaponeurotic fibrosarcoma (avian) oncogene family, protein G); MAFK (V-maf avian musculoaponeurotic fibrosarcoma oncogene family, protein K); MAS1 (MAS1 oncogene); MAX (MAX protein); MCC (Mutated in colorectal cancers); MCF2 (MCF.2 cell line derived transforming sequence); MDM2 (Mouse double minute 2, human homolog of; p53-binding protein); MEL (Mel transforming oncogene (derived from cell line NK14)- RAB8 homolog); MELL1 (Mel transforming oncogene-like 1); MET (Met proto-oncogene (hepatocyte growth factor receptor)); MLH1 (MutL (E. coli) homolog 1 (colon cancer, nonpolyposis type 2)); MOS (V-mos Moloney murine sarcoma viral oncogene homolog); MPL (Myeloproliferative leukemia virus oncogene); MSH2 (MutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)); MUM1 (Multiple myeloma oncogene 1); MYB (V-myb avian myeloblastosis viral oncogene homolog); MYBL1 (V-myb avian myeloblastosis viral oncogene homolog-like 1); MYBL2 (V-myb avian myeloblastosis viral oncogene homolog-like 2); MYC (V-myc avian myelocytomatosis viral oncogene homolog 1, lung carcinoma derived); MYCL1 (V-myc avian myelocytomatosis viral oncogene homolog 2); MYCL2 (V-myc avian myelocytomatosis viral oncogene homolog-like 1); MYCN (V-myc avian myelocytomatosis viral related oncogene, neuroblastoma derived); MYCP (V-myc avian myelocytomatosis viral oncogene homolog pseudogene); NBL1 (Neuroblastoma candidate region, suppression of tumorigenicity 1); NF1 (Neurofibromin 1 (neurofibromatosis, von Recklinghausen disease, Watson disease)); NF2 (Neurofibromin 2 (bilateral acoustic neuroma)); NFKB2 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)); NKTR (Natural killer-tumor recognition sequence); NOTCH4 (Notch (Drosophila) homolog 4); NOV (Nephroblastoma overexpressed gene); NRAS (Neuroblastoma RAS viral (v-ras) oncogene homolog); NRASL1 (Neuroblastoma RAS viral (v-ras) oncogene homolog-like 1); NRASL2 (Neuroblastoma RAS viral (v-ras) oncogene homolog-like 2); NRASL3

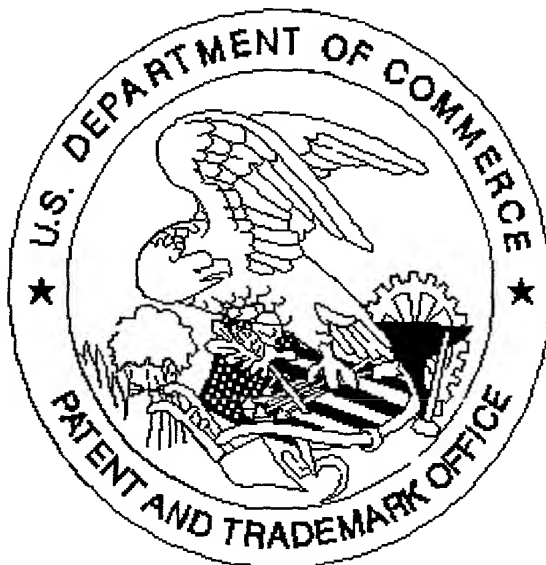
(Neuroblastoma RAS viral (v-ras) oncogene homolog-like 3); NTRK1 (Neurotrophic tyrosine kinase, receptor, type 1); OVC (Oncogene OVC (ovarian adenocarcinoma oncogene)); PACE (Paired basic amino acid cleaving enzyme (furin, membrane associated receptor protein)); PDGFB (Platelet-derived growth factor beta polypeptide (simian sarcoma viral (v-sis) oncogene homolog)); PIM1 (Pim-1 oncogene); PVT1 (Pvt-1 (murine) oncogene homolog, MYC activator); RAB1 (RAB1, member RAS oncogene family); RAB11A (RAB 11A, member oncogene family); RAB11A (RAB11A, member RAS oncogene family); RAB13 (RAB13, member RAS oncogene family); RAB2 (RAB2, member RAS oncogene family); RAB27A (RAB27A, member RAS oncogene family); RAB27B (RAB27B, member RAS oncogene family); RAB2L (RAB2, member RAS oncogene family-like); RAB3A (RAB3A, member RAS oncogene family); RAB3B (RAB3B, member RAS oncogene family); RAB4 (RAB4, member RAS oncogene family); RAB5A (RAB5A, member RAS oncogene family); RAB5B (RAB5B, member RAS oncogene family); RAB6 (RAB6, member RAS oncogene family); RAB7L1 (RAB7, member RAS oncogene family-like 1); RABL (RAB, member of RAS oncogene family-like); RAF1 (V-raf-1 murine leukemia viral oncogene homolog 1); RAFIP1 (V-raf-1 murine leukemia viral oncogene homolog 1 pseudogene 1); RALA (V-ral simian leukemia viral oncogene homolog A (ras related)); RALB (V-ral simian leukemia viral oncogene homolog B (ras related; GTP binding protein)); RAN (RAN, member RAS oncogene family); RAP1A (RAP1A, member of RAS oncogene family); RAP1AP (RAP1A, member of RAS oncogene family pseudogene); RAP1B (RAP1B, member of RAS oncogene family); RAP2A (RAP2A, member of RAS oncogene family); RAP2B (RAP2B, member of RAS oncogene family); RB1 (Retinoblastoma 1 (including osteosarcoma)); REL (V-rel avian reticuloendotheliosis viral oncogene homolog); RELA (V-rel avian reticuloendotheliosis viral oncogene homolog A (nuclear factor of kappa light polypeptide gene enhancer in B-cells 3 (p65))); RELB (V-rel avian reticuloendotheliosis viral oncogene homolog B (nuclear factor of kappa light polypeptide gene enhancer in B-cells 3)); RET (Ret proto-oncogene (multiple endocrine neoplasia MEN2A, MEN2B and medullary thyroid carcinoma 1, Hirschsprung disease)); ROS1 (V-ros avian UR2 sarcoma virus oncogene homolog 1); RRAS (Related RAS viral (r-ras) oncogene homolog); SEA (S13 avian erythroblastosis oncogene homolog); SKI (V-ski avian sarcoma viral oncogene homolog); SMARCB1 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily b, member 1); SPI1 (Spleen focus forming virus (SFFV) proviral integration oncogene spi1); SPINK1 (Serine protease inhibitor, Kazal type 1); SRC (V-src avian sarcoma (Schmidt-Ruppin A-2) viral oncogene homolog); ST5 (Suppression of tumorigenicity 5); SUPT3H (Suppressor of Ty (*S.cerevisiae*) 3 homolog); SUPT5H (Suppressor of Ty (*S.cerevisiae*) 5 homolog); SUPT6H (Suppressor of Ty (*S.cerevisiae*) 6 homolog); TAL1 (T-cell acute lymphocytic leukemia 1); TGFBR2 (Transforming growth factor, beta receptor II (70-80kD)); THPO (Thrombopoietin (myeloproliferative leukemia virus oncogene ligand, megakaryocyte growth and development factor)); THRA (Thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog)); THRB (Thyroid hormone receptor, beta (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog 2)); TIAM1 (T-cell lymphoma invasion and metastasis 1); TIM (Oncogene TIM); TM4SF1 (Transmembrane 4 superfamily member 1); TNF (Tumor necrosis factor (TNF superfamily, member 2)); TP53BP2 (Tumor protein p53-binding protein, 2); TP73 (Tumor protein p73); TPR (Translocated promoter region (to activated MET oncogene)); TRE17 (Tre-2 oncogene); USP4 (Ubiquitin specific protease 4 (proto-oncogene)); USP6 (Ubiquitin specific protease 6 (Tre-2 oncogene)); VAV1 (Vav 1 oncogene); VAV2 (Vav 2 oncogene); VHL (Von Hippel-Lindau syndrome); WNT1 (Wingless-type MMTV integration site family, member 1); WNT2 (Wingless-type MMTV integration site family member 2); WNT5A (Wingless-type MMTV integration site family, member 5A); WT1 (Wilms tumor 1); YES1 (V-yes-1 Yamaguchi sarcoma viral oncogene homolog 1); YESP (V-yes-1 Yamaguchi sarcoma viral oncogene homolog pseudogene); AMPHL (Amphiphysin-like); APC (Adenomatosis polyposis coli); ARHA (Ras homolog gene family, member A); ARHB (Ras homolog gene family, member B); ARHC (Ras homolog gene family, member C); AXL (AXL receptor tyrosine kinase); BCL2 (B-cell CLL/lymphoma 2); BCL3 (B-cell CLL/lymphoma 3); BCR (Breakpoint cluster region); BLYM (Avian lymphoma virus-derived transforming sequence); BRCA1 (Breast cancer 1, early onset); BRCA2 (Breast cancer 2, early onset); CBL (Cas-Br-M (murine) ecotropic retroviral transforming sequence); CCND1 (Cyclin D1 (PRAD1: parathyroid adenomatosis 1)); CDH1 (Cadherin 1, E-cadherin (epithelial)); CDK4 (Cyclin-dependent kinase 4); CDKN1A (Cyclin-dependent kinase inhibitor 1A (p21, Cip1)); CDKN1C (Cyclin-dependent kinase inhibitor 1C (p57, Kip2)); CDKN2A (Cyclin-dependent kinase inhibitor 2A (melanoma, p16, inhibits CDK4)); CDKN2B (Cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)); CHES1 (Checkpoint suppressor 1); D10S170 (DNA segment, single copy, probe pH4 (transforming sequence, thyroid-1,)); DCC (Deleted in colorectal carcinoma); DDX6 (DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 6 (RNA helicase, 54kD)); E2F1 (E2F transcription factor 1); EIF3S6 (Eukaryotic translation initiation factor 3, subunit 6 (48kD)); ELE1 (RET-activating gene ELE1); ELK3 (ELK3, ETS-domain protein (SRF accessory protein 2) NOTE: Symbol and name provisional.); EMP1 (Epithelial membrane protein 1); EMS1 (Ems1 sequence (mammary tumor and squamous cell carcinoma-associated (p80/85 src substrate))); EPHA1 (EphA1); EPHA3 (EphA3); ETV3 (Ets variant gene 3); EVI1 (Ecotropic viral integration site 1); EWSR1 (Ewing sarcoma breakpoint region 1); FAT (FAT tumor suppressor (*Drosophila*) homolog); FER (Fer (fps/fes related) tyrosine kinase (phosphoprotein NCP94)); FHIT (Fragile histidine triad gene); FKHL1 (Forkhead (*Drosophila*)-like 1); FLT1 (Fms-related tyrosine kinase 1 (vascular endothelial growth factor/vascular permeability factor receptor)); FOSL1 (FOS-like antigen-1); FOSL2 (FOS-like antigen 2); GLI2

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(GLI-Kruppel family member GLI2); GLI3 (GLI-Kruppel family member GLI3 (Greig cephalopolysyndactyly syndrome)); HCK (Hemopoietic cell kinase); HKR3 (GLI-Kruppel family member HKR3); ING1 (Inhibitor of growth 1); IRF4 (Interferon regulatory factor 4); KAI1 (Kangai 1 (suppression of tumorigenicity 6, prostate; CD82 antigen (R2 leukocyte antigen, antigen detected by monoclonal and antibody IA4))); LCK (Lymphocyte-specific protein tyrosine kinase); LTA (Lymphotoxin alpha (TNF superfamily, member 1)); LTB (Lymphotoxin beta (TNF superfamily, member 3)); MIS1 (Membrane component, chromosome 1, surface marker 1 (40kD glycoprotein, identified by monoclonal antibody GA733)); M4S1 (Membrane component, chromosomal 4, surface marker (35kD glycoprotein)); MADH4 (MAD (mothers against decapentaplegic, Drosophila) homolog 4); MAX (MAX protein); MCC (Mutated in colorectal cancers); MEN1 (Multiple endocrine neoplasia I); MLH1 (MutL (E. coli) homolog 1 (colon cancer, nonpolyposis type 2)); MSH2 (MutS (E. coli) homolog 2 (colon cancer, nonpolyposis type 1)); NBL1 (Neuroblastoma candidate region, suppression of tumorigenicity 1); NF1 (Neurofibromin 1 (neurofibromatosis, von Recklinghausen disease, Watson disease)); NF2 (Neurofibromin 2 (bilateral acoustic neuroma)); NFKB2 (Nuclear factor of kappa light polypeptide gene enhancer in B-cells 2 (p49/p100)); NKTR (Natural killer-tumor recognition sequence); NME1 (Non-metastatic cells 1, protein (NM23A) expressed in); NOV (Nephroblastoma overexpressed gene); NTRK1 (Neurotrophic tyrosine kinase, receptor, type 1); PDGFRL (Platelet-derived growth factor receptor-like); PLA2G2A (Phospholipase A2, group IIA (platelets, synovial fluid)); PTCH (Patched (Drosophila) homolog); PTEN (Phosphatase and tensin homolog (mutated in multiple advanced cancers 1)); RB1 (Retinoblastoma 1 (including osteosarcoma)); SMARCB1 (SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily b, member 1); SPINK1 (Serine protease inhibitor, Kazal type 1); ST5 (Suppression of tumorigenicity 5); SUPT3H (Suppressor of Ty (S.cerevisiae) 3 homolog); SUPT5H (Suppressor of Ty (S.cerevisiae) 5 homolog); SUPT6H (Suppressor of Ty (S.cerevisiae) 6 homolog); TAL1 (T-cell acute lymphocytic leukemia 1); TGFBR2 (Transforming growth factor, beta receptor II (70-80kD)); TIAM1 (T-cell lymphoma invasion and metastasis 1); TIM (Oncogene TIM); TM4SF1 (Transmembrane 4 superfamily member 1); TNF (Tumor necrosis factor (TNF superfamily, member 2)); TP53 (Tumor protein p53 (Li-Fraumeni syndrome)); TP53BP2 (Tumor protein p53-binding protein, 2); TP73 (Tumor protein p73); VHL (Von Hippel-Lindau syndrome); WNT1 (Wingless-type MMTV integration site family, member 1); WNT2 (Wingless-type MMTV integration site family member 2); WNT5A (Wingless-type MMTV integration site family, member 5A); WT1 (Wilms tumor 1)

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